This guidance provides specific standards and expectations for conducting wetland delineations and submitting wetland delineation reports for regulatory purposes in Wisconsin. It supplements and emphasizes information in *Basic Guide to Wisconsin's Wetlands and Their Boundaries*, the 1987 *Corps of Engineers Wetland Delineation Manual* (Manual) and applicable regional supplements. In 1996, the Corps of Engineers (the Corps), St. Paul District Regulatory Branch issued *Guidelines for Submitting Wetland Delineations to the St. Paul District Corps of Engineers in Wisconsin*. Significant improvements to the application of the science behind wetland and aquatic resource delineation have been made since 1996: regional supplements have been published incorporating the *Field Indicators for Hydric Soils in the U.S.*, the *National Wetland Plant List* (NWPL) has been updated, Version 2.0 of the *Corps of Engineers Wetland Delineation Manual* is being finalized, and techniques and approaches to delineation have been refined and improved over the past 16 years. This guidance replaces the 1996 guidance and defines wetland regulatory agency expectations for submittal of delineation reports in Wisconsin. Numerous court cases involving aquatic resource identification and regulation have emphasized the need for accurate and defensible documentation of site conditions.

Providing standards for wetland delineation reports common to wetland regulatory agencies in Wisconsin increases the efficiency of regulatory review. Using the guidance will help regulatory review agencies more efficiently review delineation reports for essential components and more readily identify reports that are poorly documented.

This guidance was developed jointly by the U.S. Army Corps of Engineers and the Wisconsin Department of Natural Resources. As such, any suggested alterations to this guidance will require the approval of both agencies.

We are now soliciting comments from the public on this guidance. Once the 21 day notice period is complete, all comments will be considered, revisions will be made to the guidance documents as needed, and the final guidance document will be made available to internal and external stakeholders. Comments related to this draft guidance document should be sent to Tom Nedland at: thomas.nedland@wisconsin.gov.

US Army Corps of Engineers
St. Paul District

WISCONSIN DEPT. OF NATURAL RESOURCES

Public Notice

PUBLIC NOTICE DATE: May X, 2014

Guidance for Submittal of Delineation Reports to the St. Paul District Army Corps of Engineers and the Wisconsin Department of Natural Resources

Introduction – Purpose and Background of Guidance

This guidance provides specific standards and expectations for conducting wetland delineations and submitting wetland delineation reports for regulatory purposes in Wisconsin. It supplements and emphasizes information in *Basic Guide to Wisconsin's Wetlands and Their Boundaries*, the 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Manual) and applicable regional supplements. In 1996, the Corps of Engineers (the Corps), St. Paul District Regulatory Branch issued *Guidelines for Submitting Wetland Delineations to the St. Paul District Corps of Engineers in Wisconsin*. Significant improvements to the application of the science behind wetland and aquatic resource delineation have been made since 1996: regional supplements have been published incorporating the *Field Indicators for Hydric Soils in the U.S.*, the *National Wetland Plant List* (NWPL) has been updated, Version 2.0 of the *Corps of Engineers Wetland Delineation Manual* is being finalized, and techniques and approaches to delineation have been refined and improved over the past 18 years. This guidance replaces the 1996 guidance and defines wetland regulatory agency expectations for submittal of delineation reports in Wisconsin.

Numerous court cases involving aquatic resource identification and regulation have emphasized the need for accurate and defensible documentation of site conditions. Although wetland delineation is the focus of this guidance, it is important to recognize that other aquatic resources affected by regulated activities include waters of both the U.S. and Wisconsin. Wetlands are both a subset of and affected by the aquatic resources that make up the greater hydrologic landscape, which include groundwater, lakes, rivers, streams, springs, ditches and ponds. These features are often considered waters of the U.S. and waters of the state. It is important that delineation reports include the identification of the entire hydrologic landscape.

Providing standards for wetland delineation reports common to wetland regulatory agencies in Wisconsin increases the efficiency of regulatory review. Using the guidance will help regulatory review agencies more efficiently review delineation reports for essential components and more readily identify reports that are poorly documented. **A delineation report that does not comply with this guidance will not be approved for wetland regulatory purposes.**

In addition to providing guidance on wetland delineation, this document also references methods that can be used to conduct wetland determinations. A wetland determination is a first step to every wetland

delineation, but does not identify wetland boundaries and does not constitute a wetland delineation. Wetland delineations differ from wetland determinations by placing an emphasis on the accurate identification of wetland boundaries. Wetland determinations can occasionally be conducted at times of the year when wetland delineations cannot, and do not require the same level of data collection required of wetland delineations. Because wetland determinations are completed without regard to the accurate identification of wetland boundaries, determinations cannot be used for making permit related decisions in areas located in or directly adjacent to wetlands.

Section 1. Wetland Delineation Updates since 1996

1.1 Update to Corps Manual (Version 2.0)

An update to the 1987 *Corps of Engineers Wetland Delineation Manual* is under development and in 2014 a notice requesting public comment on Version 2.0 is expected to be published in the Federal Register. This guidance will be updated as necessary once the public review process for Version 2.0 has been completed and adopted for regulatory implementation.

1.2 Regional Supplements

The 1987 Manual provides technical guidance and procedures, from a national perspective, for identifying and delineating wetlands. A three-factor approach examining indicators of hydrophytic vegetation, hydric soils and wetland hydrology is employed. In 2005, a process to develop field indicators, guidance and methods specific to geographic regions of the United States was initiated. This was a recommendation of the National Academy of Sciences (National Research Council 1995) because regional differences in climate, geology, soils, hydrology, plant communities, and other factors, cannot be adequately considered in a single national manual. The result was the development of 10 "regional supplements" to the 1987 Manual based on the geographic regions as shown in Figure 1. These regional supplements increase the regional sensitivity of wetland delineation methods.

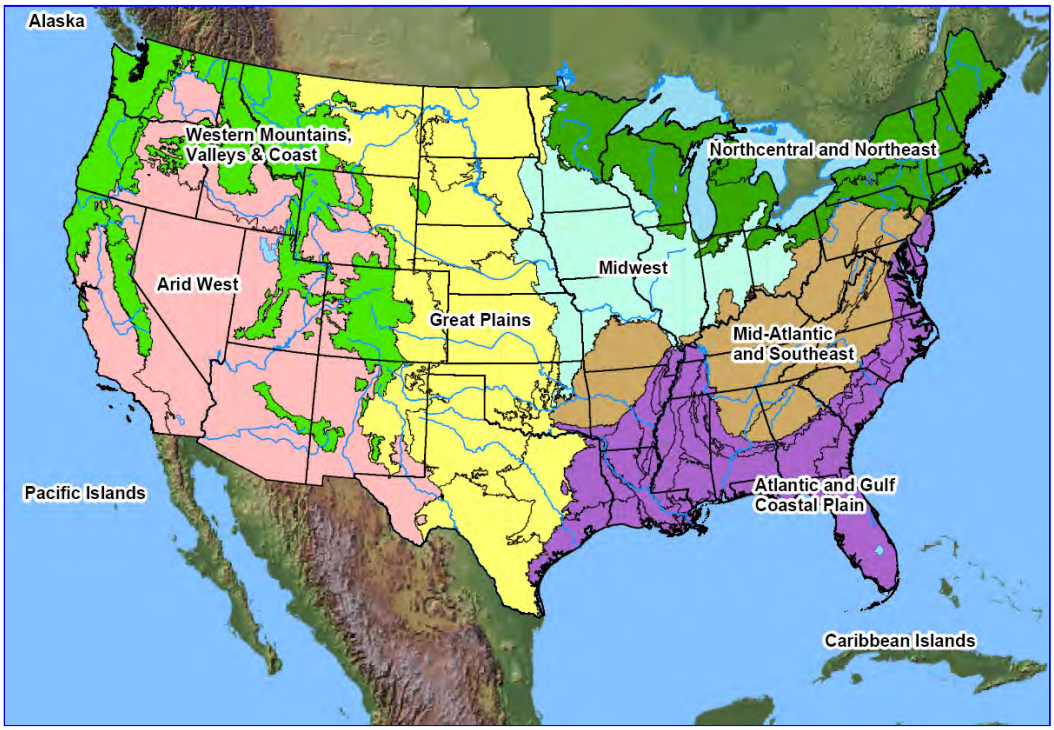

Figure 1. Geographic Regions used for Regional Supplements and NWPL

Two regional supplements apply to Wisconsin and the current versions (Version 2.0) were published on the dates shown: Midwest (August 2010) and Northcentral/Northeast (January 2012). These documents are available on the Corps website:

http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/reg_supp.aspx.

Field indicators in the 1987 Manual for hydrophytic vegetation, hydric soil, and wetland hydrology were replaced by new field indicators in the regional supplements. For example, there are 25 to 29 hydrology field indicators in each of the supplements, replacing the 10 that were in the 1987 manual. (Refer to Appendix A for a list of the hydrology indicators used in Wisconsin.)

Regionally-based "Field Indicators for Hydric Soils in the U.S." were also developed in the mid-1990's by the Natural Resources Conservation Service (NRCS), in conjunction with the National Technical Committee for Hydric Soils (NTCHS) and other agencies, and have been incorporated into the supplements. Refer to Appendix A for a comparison of the Field Indicators for Hydric Soils in the supplements used in Wisconsin. Other important changes include the definition of "growing season" and the hydrology technical standard for highly disturbed or problematic wetland situations. Other portions of the 1987 Manual remain in effect including the methods section. Where differences occur in the 1987 Manual and a regional supplement, the regional supplement takes precedence. For example, each regional supplement includes a data sheet for documentation of site conditions, and these replace the data sheets in the 1987 Manual. Periodic updates to the regional supplements are anticipated (e.g., every 2 to 5 years) and will be posted on the Corps website.

Boundaries between supplement regions are to be considered broadly (i.e., miles wide). Wetland delineations are not likely to differ along these boundaries regardless of which abutting supplement is used. In transitional areas, investigators must use experience and best professional judgment to select the supplement and indicators that are appropriate for a site based on its physical and biological characteristics. For example, methods in one supplement may address a particular problematic or disturbed situation better than another. If in doubt about which supplement to use in a transitional area, apply each supplement, compare the results, and clearly document the ultimate decision of the wetland line. The tables provided in Appendix A list the indicators for use in each regional supplement; use of an indicator from an abutting supplement should be used where applicable, but must be supported with adequate documentation and justification for why the indicator applies.

Figure 2 provides a general map showing the Regional Supplement boundaries in Wisconsin. A larger scale high-resolution map is available on the Corps' website. Another way to determine which Supplement applies is to go to WDNR's Surface Water Data Viewer by accessing the WDNR website at dnr.wi.gov and searching keyword "SWDV", and clicking on "Show Layers." In the folder "Forests and Landcover," click on the "Ecological Landscapes" layer. The Midwest Supplement applies to all areas within these three ecological landscapes: Western Coulee and Ridges, Southwest Savanna and Southern Lake Michigan Coastal. The Northcentral/Northeast Supplement applies to all other areas.

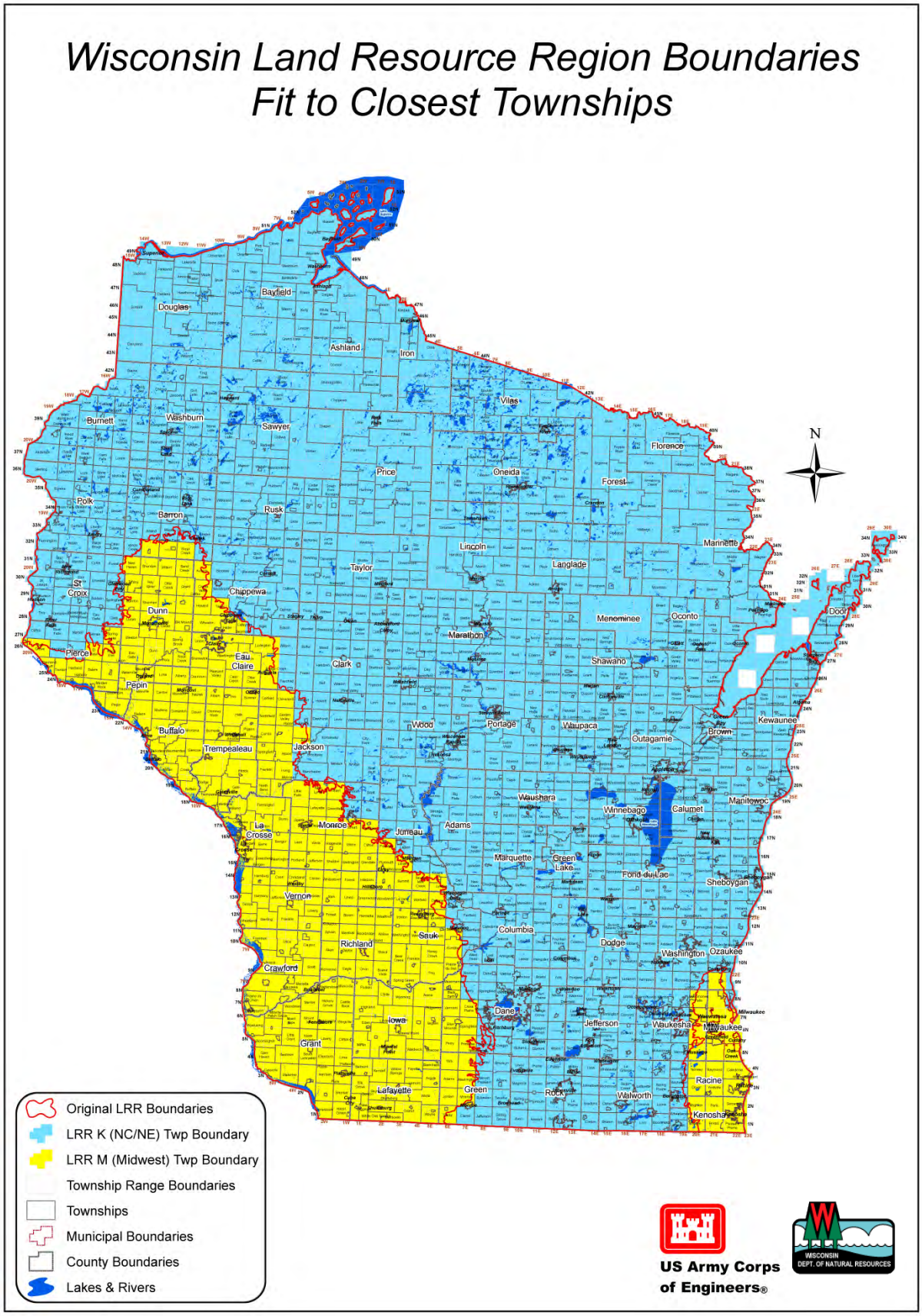

Figure 2. Regional Supplement Boundaries to Closest Townships in Wisconsin.

1.3 National Wetland Plant List (NWPL)

From 1988 to June 2012, the official NWPL used for wetland delineation purposes was a 1988 list published by the U.S. Fish and Wildlife Service (USFWS). In 2006, responsibility for the NWPL was transferred to the Corps. From 2008 to 2012 the NWPL underwent a formal review and revision process before being finalized for use on June, 1, 2012, with annual updates since. The current NWPL is posted at:

http://rsgisias.crrel.usace.army.mil/NWPL/

Important changes in the updated NWPL compared to the 1988 NWPL include:

a. **Regionalization**: The NWPL is regionalized based on the regional supplement boundaries (Figure 1) in contrast with the USFWS regional boundaries used for the 1988 list that were based on state boundaries. Users have the option of printing state-specific or regional supplement-specific plant lists from the NWPL website.
b. **Nomenclature**: Changes in the scientific names of hundreds of plant species have occurred since 1988. The NWPL will be updated regularly as science-based changes are made.
c. **Sub-species on the NWPL**: The NWPL assigns indicator statuses at the species level only. As was the case on the 1988 list, subspecies and varieties are no longer split out and assigned their own indicator status on the updated NWPL because there is insufficient data for this level of precision.
d. **Elimination of No Occurrence (NO) and No Indicator (NI)**: The NO and NI indicator status categories have been eliminated in the new NWPL.
e. **Facultative Categories**: The [+] and [-] modifiers for the facultative categories (FACW, FAC, FACU) in the 1988 list have been eliminated because insufficient data exists for this level of precision in assigning an indicator status. Note that this change had been previously implemented by some of the regional supplements.
f. **Updates**: A process for updating the NWPL has been adopted by the Corps. Updates are anticipated on an annual basis to keep the nomenclature up-to-date and to stay consistent with the evolving science. Check the NWPL web site to stay current.
g. **Challenge Procedure**: A procedure to petition a change in an assigned indicator status has been adopted.
h. **NWPL Indicator Rating Definitions**: The NWPL places plant species into one of five categories based on qualitative ecological descriptions (see Table 1). Previous lists categorized species based on estimated percentages representing the frequency they occur in wetlands. Quantitative frequency categories (numerical percentages) are now used only for field-based studies designed to challenge a species' wetland rating.

Table 1. Wetland indicator status ratings based on ecological descriptions

Wetland Indicator Status	Definition
Obligate Wetland (OBL)	Almost always occur in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Occur in wetlands and non-wetlands
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland (UPL)	Almost never occur in wetlands

Table 2 lists a few commonly identified plant species in Wisconsin and compares their old 1988 indicator status with their updated statuses between regions.

Table 2. Updated NWPL Example Species

Species	1988 List Region 3	Updated NWPL	
		NC/NE	MW
Abies balsamea (Balsam Fir)	FACW	FAC	FACW
Alnus incana (Speckled Alder)	OBL	FACW	FACW
Andropogon gerardii (Big Bluestem)	FAC-	FACU	FAC
Eurybia macrophylla (Large-leaved Aster)	UPL	UPL	FACU
Frangula alnus (Glossy buckthorn)	FAC+	FAC	FACW
Poa pratensis (Kentucky Bluegrass)	FAC-	FACU	FAC
Rhamnus cathartica (Common Buckthorn)	FACU	FAC	FAC

Consult the NWPL web site for more information. All related documents are posted as well as distribution maps, photographs and ink drawings of the approximately 8,200 species on the NWPL.

1.4 Jurisdictional Determination Request Guidance for U.S. Army Corps of Engineers Purposes

In 2008 following a landmark Supreme Court decision affecting the Corps' jurisdiction over wetlands (*Rapanos)*, the Corps provided guidance to delineators in Wisconsin for providing documentation of site conditions to assist Corps staff in determining if the Corps has jurisdiction over a particular wetland (jurisdictional determination). This guidance remains relevant and should be referred to by consultants in completing delineation reports. This document can be found at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/WI-Special/publicJDguidanceSN.pdf.

Note: Notwithstanding the jurisdictional findings by Corps staff, the WDNR regulates ALL wetlands. Therefore, identification of all aquatic resources will aid in regulatory review by all agencies involved.

Section 2. Delineation Report Content

Delineation reports should at minimum include the following components (refer to Appendix B for the WDNR checklist that should be submitted with the delineation report):

- **Clear identification of the site location and assessment area.** This is typically the property line for most projects, although linear projects such as roadways or utility lines are typically evaluated within a designated right-of-way or corridor width. Regardless of project type, the delineator must clearly identify the boundary of the review area on maps that are part of the report.
- **General description of field conditions at the time of review.** If a field review is conducted, the report must include the date(s) of review and both climatic and other conditions that influence the character and nature of site hydrology and any associated aquatic resources.
- **Identification of who conducted the review and their qualifications.**
- **Purpose of the review.** This can be important in determining the level of effort and precision required to adequately identify and characterize aquatic resources on the site. Delineations are almost always conducted for the purpose of some type of regulatory compliance.
- **Methodology.** The report should identify the specific methods, techniques, data and literature sources used to complete the delineation. The current version of the Manual and supplements

describe a variety of different approaches and data sources that can be used depending on the site conditions and other circumstances; the report should identify which were used.

- **Mapping Resources.** The report should include readily available mapping products that provide useful information related to wetlands and aquatic features. The boundaries of the review area, north arrow, scale and legend must be identified on each map, which must also be at a scale allowing for identification of relevant information. At a minimum, the following figures must be included in the report (may be combined, as appropriate):
    - Site location, with adequate detail providing a reviewer directions to the site
    - Topography data from sources such as USGS quads, a topographic survey or LiDAR data
    - NRCS Web Soil Survey (WSS) map
    - Wisconsin Wetland Inventory (WWI) or other wetland inventory mapping such as the National Wetland Inventory
    - Recent aerial photography, and historical imagery if that data facilitates a complete delineation report
    - A final Delineation Figure depicting and labeling the identified wetland or aquatic resources and sampling points referenced to corresponding data forms
- **Data Forms.** For delineations involving onsite field assessment, supporting data forms from the applicable supplement, or equivalent, are required. The data forms provide the supporting field documentation for report conclusions. These forms must be fully completed and correspond to sample point locations identified on one or more mapping resources in the report. Photographs of the sampling locations and overall site conditions can often provide further documentation of observed conditions.
- **Results and Discussions.** Basic conclusions should be discussed and described in the report. This includes a physical description of the site's vegetation, soils and hydrology. The report should thoroughly describe wetlands, other aquatic resources and non-wetland areas in terms of their vegetation (plant community type), landscape position, hydrology and soils. The report should also discuss the consistency of the delineation with the mapping resources. For example, if the field delineation fails to identify wetlands in mapped hydric soil areas, the report should discuss this inconsistency and possible reasons for it. It should be noted that areas fulfilling all three wetland parameters should be shown on the final delineation figure, regardless of the delineator's opinion related to potential agency jurisdictional responsibilities.

Section 3. Delineation Methods and Data Collection

This section emphasizes and augments methods and data sources discussed in the 1987 Manual, regional supplements and Corps guidance. The guidance is not comprehensive for every situation and site, but provides direction related to issues and deficiencies that have been identified in a substantial number of past delineations and reports. This section provides more specific information related to data collection and recording for delineation submissions in Wisconsin.

3.1 Off-Site Methods

Off-site methods are employed at the beginning stages of every delineation. They involve the use of mapping products such as aerial photographs and soils maps to identify potential wetland and aquatic resources. This review can provide the basis for a wetland determination when a site-visit is not possible or deemed necessary (NOTE: this would not be accepted as a wetland delineation; see Introduction), otherwise offsite methods will help direct onsite investigations and identify sampling units that require data collection (Figure 3). Sampling units are typically distinguished by differences in landscape position,

vegetation, soils, hydrology and/or disturbance relevant to the wetland or aquatic resource determination or delineation. Often the simplest and most efficient approach is to identify and map plant community/vegetation units (see Figure 3). Plant community units typically reflect spatial variations in geomorphology, hydrology, soils and other factors that are important to the formation and maintenance of wetlands, consequently they can often be interpreted through use of available map resources such as WSS, WWI mapping, or recent aerial photographs. However, when natural vegetation is absent or disturbed, sampling units based on other factors may be used, and documentation must provide justification for the sampling units chosen.

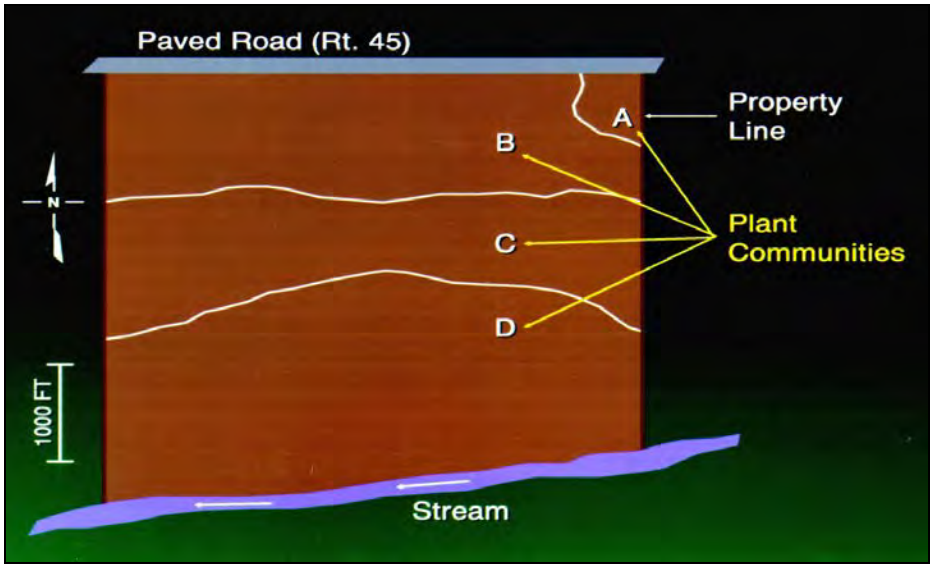

Figure 3. Example depicting determination of sampling units

If an off-site determination is the sole basis for obtaining regulatory concurrence or a Section 404 jurisdictional determination, a statement must accompany the report explaining that it is based on remote sensing techniques and does not constitute a field-based delineation of the wetland boundary. **NOTE: The use of offsite-only methods may limit the utility of the determination for other regulatory situations; this level of wetland identification is not appropriate for delineating wetland boundaries, except in cases where a site has been significantly altered or disturbed (e.g., expansive filling or leveling at a site that has obliterated all evidence of the site's previous condition).**

3.2 On-Site Data Collection

On-site data collection should focus on representative locations, as identified by the off-site methods described above, and adjusted during the field investigation based upon observed field conditions. Selecting appropriate sample point locations within sampling units is critical in adequately documenting site conditions and justifying delineation decisions. Although there is a tendency to sample in areas that are more accessible and/or areas with characteristics that are relatively easy to interpret and record, selected sample locations should be chosen based upon their potential to adequately describe identified sampling units. A more systematic sampling approach may be required if sampling units are unclear or highly interspersed.

At least one data form should be completed in each sampling unit (see Figure 4).

Sampling points and associated data forms from both sides of a wetland boundary are used to document differences between wetland and non-wetland areas. Data forms do not need to show a contrast in all

characteristics (soils, vegetation and hydrology) from wetland to upland. In fact, it is common that one or more characteristics will be the same for both wetland and upland sample points when sampling near the transition (Figure 5). In general, moving up the slope from within the known wetland, the sampling point where one of the three parameters is no longer met often identifies the transition to upland, keeping in mind instances when a parameter may not be readily apparent due to environmental or seasonal constraints (drier than normal periods, problematic soils, seasonal vegetation fluctuations, etc.).

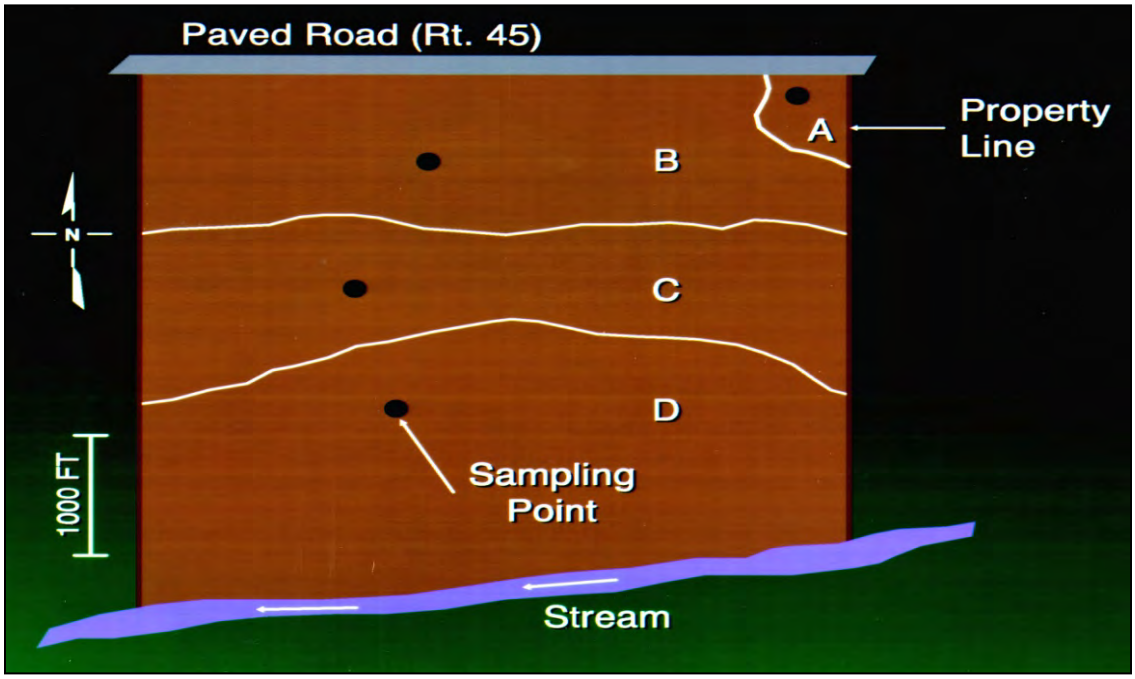

Figure 4. Sampling points located in each sampling unit

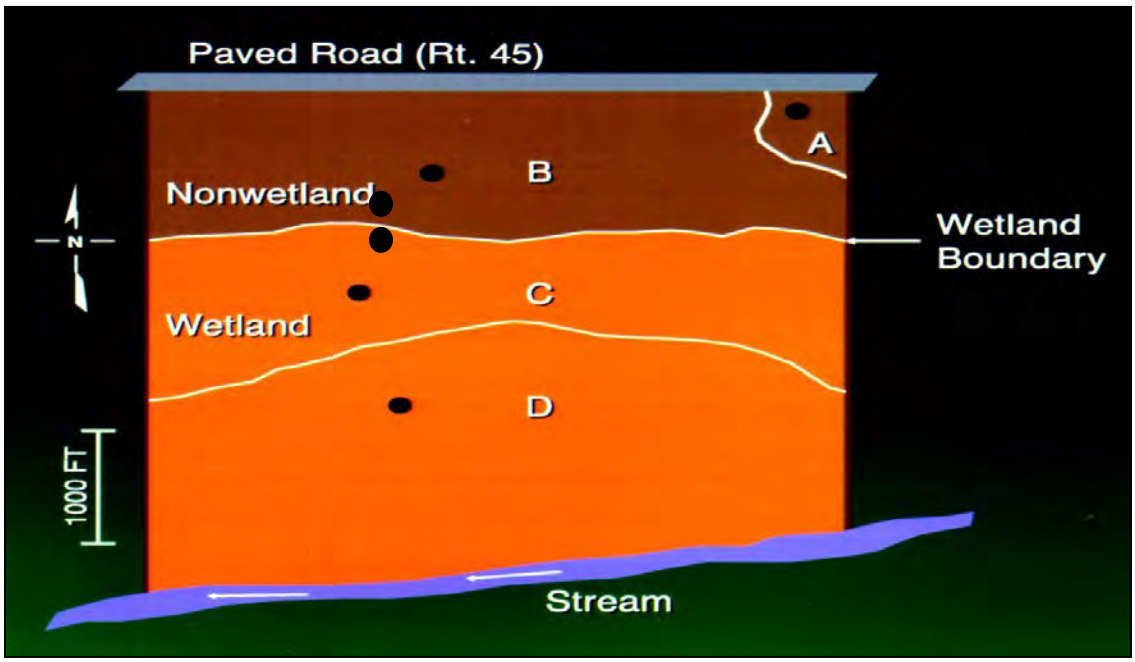

Figure 5. Sampling points upslope and downslope of wetland line

Figure 6 represents a more complex site where several transects are deemed necessary to adequately characterize the site. In this example, transects start at the midpoint of the established baseline segment except the most upstream transect, which was repositioned to include community type A.

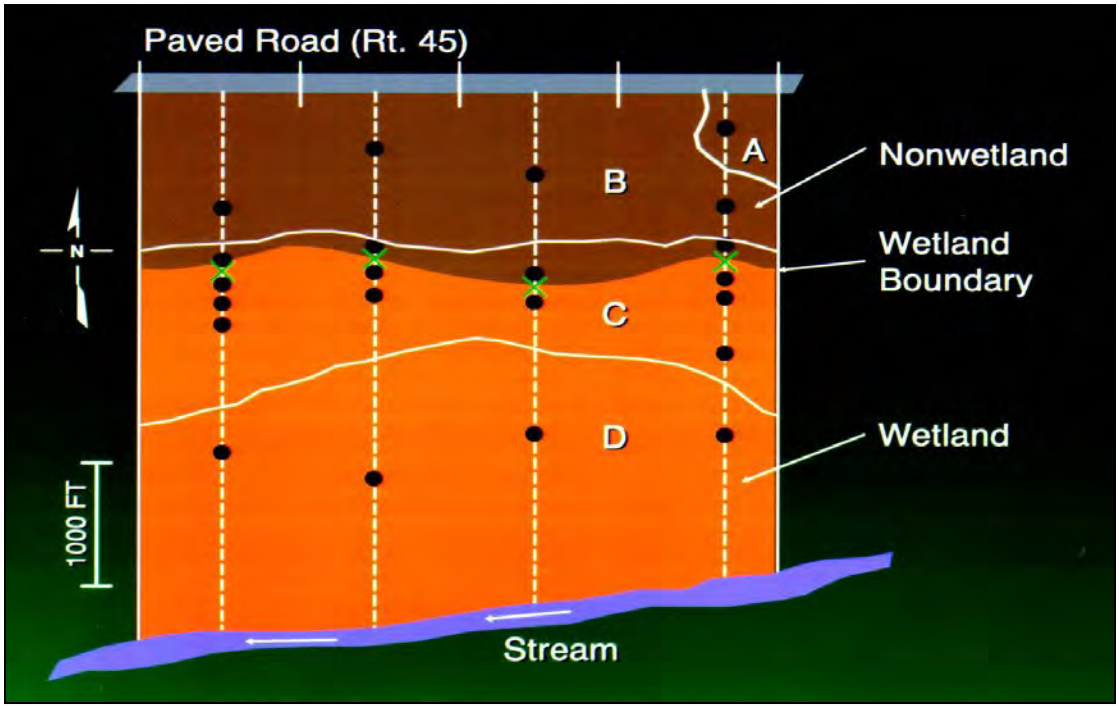

Figure 6. Additional transects and sampling points for more complex landscapes (X=wetland line).

The physical marking of a wetland boundary will be the final step in the field delineation after sampling has been completed. The spacing of flags or other markers used to identify the wetland boundary should be in accordance with the implied precision of the delineation, i.e., a more detailed delineation would require more sampling and more flagging. A general rule of thumb for marking wetland boundaries in the field is to locate markers so that at each point adjacent markers in each direction are visible, either by a surveyor marking the flags or a reviewer assessing the boundary. Delineation boundaries will be reviewed in the field, so it is important to choose the appropriate type of marker (flags, wooden lath, steel posts, etc.) for the situation. Consideration should be given to the time of year when a delineation is anticipated to be reviewed and other factors that may affect the relative permanence of the marker. For example, the use of short flags along a wet meadow edge in the early portion of the growing season may be obscured by the time of a mid to late growing season field review. Wooden lathe used to mark a boundary in an active pasture are likely to be lost within one field season as cattle rub and lean against them.

These physical markers can be located with a Global Positioning System (GPS) unit capable of submeter accuracy and depicted on a mapping product such as an aerial photograph. If applicable, wetland boundary markers can be located as part of a legal boundary survey conducted by a Registered Land Surveyor (RLS); survey of a wetland boundary by a RLS is most appropriate if construction plans will be developed for a project on the parcel. Wetland boundaries may change over time, so wetland delineation boundaries, whether on legal boundary surveys or not, are subject to change.

3.3 General Considerations During Data Collection

3.3.1 Landform

Accurately describing the landform position of each data point is important in interpreting observed soil, vegetation, and hydrology conditions. Data forms provided in the regional supplements require landform to be identified at sample points. Figure 7 is a cross section showing different landforms and associated descriptors (i.e., slope position). This set of terms is best applied to transects or points, not generalized areas, and is ideally designed for describing differences between data points. The NRCS *Field Book for Describing and Sampling Soils* (Version 3.0, 2012) provides additional detailed descriptors that can also be used to define the landform. Terms such as hillslope or backslope for convex landforms and depression for concave landforms are often sufficient, but the use of more precise terms is more informative and may be necessary in complex situations.

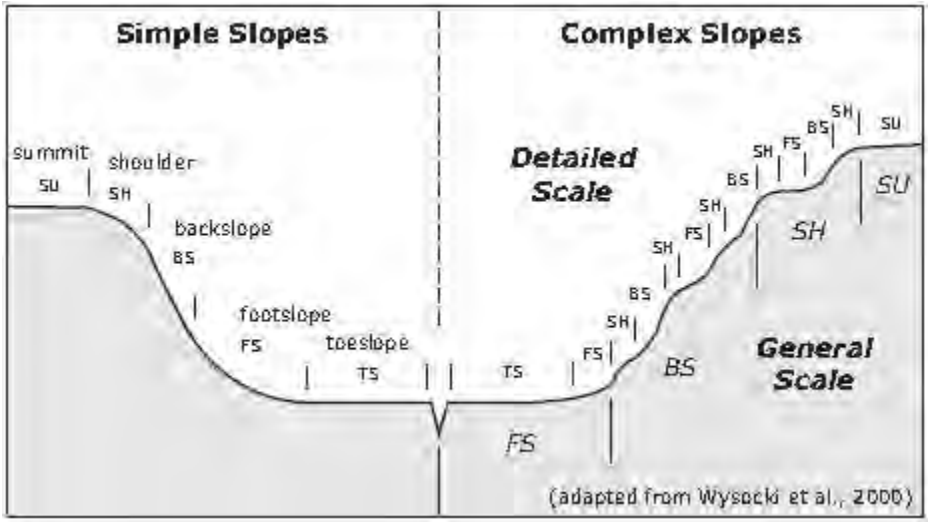

Figure 7[1]. Recording Landform on Data Forms

3.3.2 Growing Season

Identification of the growing season is important for determining the applicability of some observed primary hydrology indicators (A1, A2 and A3 only) and for hydrologic monitoring associated with the hydrology technical standard. The supplements include a field observation-based approach for determining the start and end of the growing season. The approach uses the biological activity/growth of non-evergreen plants as the indicator. The growing season can also be determined by soil temperature; growing season has begun when soil temperatures reach or exceed 41F measured at 12 inches (30 cm) below the ground surface. When the start of vegetative growth, or soil temperature, are unknown and on-site data collection is not practical, the growing season can be approximated by using a table of average dates (50% probability) of the first and last 28 degree F. temperature (referred to as the WETS Table; county-specific tables can be found at the following link: http://www.wcc.nrcs.usda.gov/climate/wetlands.html).

3.3.3 Growing Season Limitations

Wetland delineations should not be conducted outside of the growing season. Severe limitations such as frozen soil conditions, snow covered vegetation, obscured topographic breaks and low sunlight intensities

[1] Source: Schoeneberger, P.J., D.A. Wysocki, I.D. Benham, and Soil Survey Staff. 2012. Field book for describing and sampling soils, Version 3.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE

make the completion of accurate wetland delineations unfeasible and generally indefensible. Off-site techniques such as examining aerial photography and other mapping resources may provide a preliminary determination of the presence of wetland until an on-site delineation can be conducted during the growing season (see Section 3.2). As stated in Section 3.2 above, the use of offsite-only methods is not appropriate for potential projects directly adjacent to a wetland where the activity is likely to require a permit.

Some preliminary wetland data can be collected at sites outside the growing season. Trees, shrubs and certain herbaceous vegetation can usually be identified by those proficient in winter botany. Some hydrology indicators may be determined regardless the time of year, such as geomorphic position, water marks, drift lines and groundwater springs and seepages that flow year round. Landscape position and potential surface water connections may be more readily observed without the dense cover of vegetation. However, the onset of frozen soil conditions and snow cover generally preclude identification of soils, some hydrology indicators, and certain herbaceous vegetation which are often critical to making an accurate determination. Wetland boundaries are generally transitional areas and exhibit characteristics that are intermediate between obvious wet and dry areas. Making accurate observations in these intermediate areas in winter is not possible due to frozen conditions, lack of living plants, and missing or misleading hydrology conditions. For this reason, wetland delineations should not be conducted outside the growing season, and cannot be approved for concurrence until initiation of the growing season.

Site reviews conducted outside of the growing season will require field-verification during the growing season prior to final concurrence of a wetland delineation for regulatory purposes.

3.3.4 Normal Circumstances

The need to determine whether or not "normal circumstances" are present arises when conditions at a site have been physically manipulated or disturbed (i.e., atypical situation: indicators of one or more of the three wetland parameters have been removed, obscured or become misleading due to human activity or a natural event). The Corps/EPA wetland definition originally included the phrase "under normal circumstances" to prevent landowners from evading Clean Water Act regulatory authority by altering or clearing wetland vegetation. The concept is more broadly interpreted today and includes other kinds of human activities and natural events that can impact wetlands making them more difficult to identify, and it requires an evaluation of the extent and relative permanence of the physical alteration.

The delineator's review of site conditions is dependent upon the determination of normal circumstances; in general, wetland determinations on sites that represent normal circumstances are based on current conditions, whereas wetland determinations on sites that do not exhibit normal circumstances are usually based on conditions that would exist in the absence of the manipulation or disturbance. In general, normal circumstances can be described as:

1. The long-term or stable condition of a site including any authorized or other legal alterations, such as highways, dams, and other relatively permanent infrastructure and development.
2. The conditions indicated by the soils and hydrology normally present on a site, in cases where the vegetation has been altered or removed.
3. The conditions that would exist on a site in the absence of any active and discretionary manipulation of hydrology.

Examples of normal circumstances include, but are not necessarily limited to, the following:

1. Alterations that occurred before implementation of the Clean Water Act.
2. Alterations that were authorized, exempt, or did not require authorization.
3. Hydrologic modifications, such as functioning ditches or subsurface drains, that were installed legally, are relatively permanent, are maintained, and operate by gravity without any artificial input of energy or manpower.
4. Ongoing hydrologic manipulation that is permanent and non-discretionary, such as pumping of surface or groundwater for municipal water supply, done under a court order, or required for public safety.
5. A site with undisturbed conditions, including those wetlands identified as problem areas (i.e., indicators of one or more of the three wetland parameters are missing, obscured or misleading due to natural, normal, seasonal or annual variability, or permanently due to the nature of the soils or plant species on the site).

Examples of site alterations that are not the normal circumstances include, but are not necessarily limited to, the following:

1. Unauthorized or illegal activities or activities done with the intent of evading Clean Water Act jurisdiction.
2. Total or partial clearing of vegetation, or selective removal of plant species (i.e., managed plant community).
3. The presence of a crop, tree farm, improved pasture, other planted vegetation, or cultivars (i.e., managed plant community).
4. Destruction of hydric soil indicators by cultivation or mixing of soil layers.
5. Irrigation.
6. Discretionary pumping of surface or groundwater, such as pumping for agricultural purposes.
7. Active and discretionary manipulation of water tables, such as subirrigation and other active water-table management for crop production or management of soil moisture and nutrients.

See Appendix C for a flow chart illustrating the steps in the evaluation of normal circumstances.

Antecedent precipitation is not figured into the determination of "normal circumstances." Recent precipitation helps to determine whether the site review is conducted during "normal environmental conditions" for that time of year, but it does not provide information on long-term hydrologic conditions that are a factor in determining normal circumstances. Methods for determining a site's antecedent condition are discussed later in this document (Section 3.7.3). Figure 8 shows where both normal environmental conditions and normal circumstances are recorded on the general information section of each regional supplement data form.

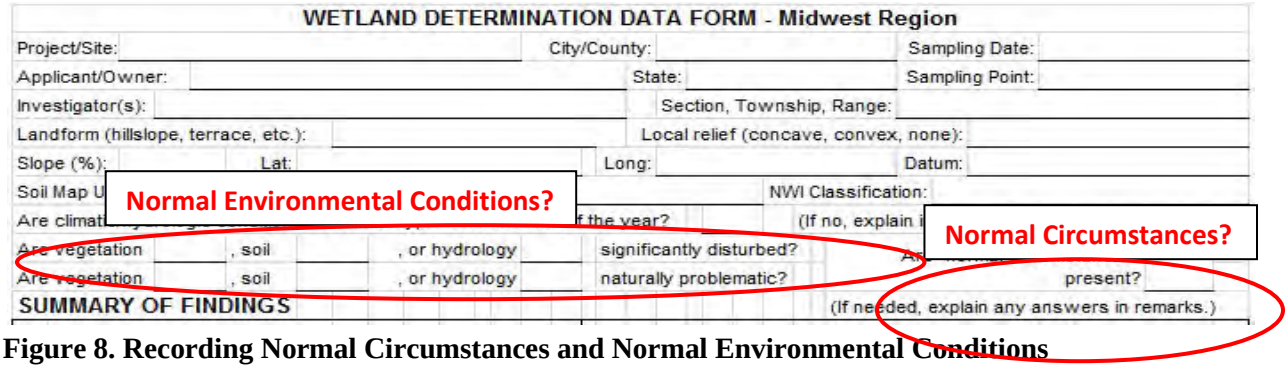

Figure 8. Recording Normal Circumstances and Normal Environmental Conditions

3.4 Identify all aquatic resources

During the off-site review of the project area, indications of aquatic resources other than wetlands should also be identified. Local water resource inventories should be used wherever available. Streams and ditches can be identified using the National Hydrography Dataset (NHD), the WDNR Surface Water Data Viewer by accessing the WDNR website at dnr.wi.gov and searching keyword "SWDV", topographic maps and local water resource inventories. Where available, community storm sewer mapping may provide information on the flow through, to and from aquatic resources and wetlands.

For the purposes of determining Corps jurisdiction over wetlands, it is helpful to the agency staff if consultants can identify all potential connections and flow paths between aquatic resources by providing observations obtained during the normal course of data collection in reports, wherever possible. Even if the assessment area is limited to a specific property line, observations should extend beyond the area from acceptable public vantage points, such as culverts under roadways to the extent practical while considering safety and private property concerns. **Please note that this guidance is NOT directing consultants to flag the boundaries of ditches or streams nor to collect any more data than general location, connections and direction of flow, if any, based on easily gathered observations during wetland data collection. This information will assist agency staff in reviews seeking concurrence and can speed the review when jurisdictional determinations are requested.** On report mapping, identify watercourses (ditches, streams, etc.) with a blue line, and provide short description in report text.

Refer to the "Jurisdictional Determination Request Guidance" as discussed in Section 1.4 for additional information. **Please note that WDNR has jurisdiction over all wetlands in the state, regardless of their connectivity to other surface waters.**

When identifying the locations of aquatic resources other than wetlands, information regarding the Ordinary High Water Mark (OHWM) is helpful in identifying the extent of the effect that water has had on the resource. (See Regulatory Guidance Letter (RGL) 05-05: http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl05-05.pdf)
The Corps defines OHWM as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of surrounding areas." The RGL lists physical characteristics, such as a bed and bank, to look for while collecting field data, to the extent that they can be identified and are deemed reasonably reliable.

NOTE: The state of Wisconsin defines the OHWM as the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation or other easily recognized characteristic.

Observations should be made of indications that water has had an effect on any given landscape position; photographs of key features and indicators provide excellent documentation for reporting. **Provide documentation of any observations for agency reviewers to consider in their final concurrence.**

Please note that all OHWM determinations, for either the state or federal programs, are made by the respective agency staff only. OHWM observations provided by consultants are helpful in the overall determination, but should not be construed as a final determination for state or federal purposes unless documentation of agency concurrence is provided.

3.4.1 Jurisdiction

Delineation reports should focus solely on the identification and delineation of wetlands and other aquatic resources. Although these reports provide crucial information for making later regulatory decisions, they should not be used by the delineator to make regulatory conclusions. Delineation reports that provide a thorough and complete analysis of site conditions will often facilitate state and federal jurisdictional determinations. These determinations should remain separate from the technical delineation report. For example, if a wetland clearly appears to be an isolated basin, with no inlets or outlets, the report may indicate these facts, but only the Corps, in coordination with the Environmental Protection Agency (EPA), can make the final jurisdictional determination based upon federal policy (some isolated basins are jurisdictional waters of the U.S.). WDNR will likewise make its own determinations regarding its regulatory jurisdiction.

Use the form "Request for Corps of Engineers Wetland Delineation Review" found here https://team.usace.army.mil/sites/MVP/OP/R/Shared%20Documents/Template%20Letters/Delineations%20and%20JDs/wet%20del%20con%20submittal%20v.2.pdf to obtain a Corps jurisdictional determination. For either JD process (preliminary or approved), a wetland delineation review for concurrence would normally be conducted. The 'Wetland Delineation Concurrence' option is ONLY used when no decision on jurisdiction is requested.

Wetlands created due to anthropogenic activities (e.g., ponds built in uplands) are often encountered and are often subject to state and federal wetland regulations. If these areas meet wetland requirements they should be shown on the final delineation figure, regardless of the delineator's opinion related to potential agency jurisdictional responsibilities. Only the Corps and WDNR can make the final jurisdictional determinations related to artificially created wetlands.

3.5 Soils Guidance

Soil mapping information provides essential information related to the location of potential wetlands for wetland delineation field review. Official soil mapping data should be obtained from the USDA *Web Soil Survey* site at: http://websoilsurvey.nrcs.usda.gov. Older paper-bound or CD-ROM versions of county soil surveys should only be used for historical perspective as they are out of date.

A Mobile Soil App developed by NRCS/UC Davis for smartphones is described at the following website: http://casoilresource.lawr.ucdavis.edu/drupal/node/886.

In most cases, delineation reports should not include extraneous soils-related information such as the definition of hydric soils, state or county hydric soil lists, official series descriptions (OSD) and the text of hydric soil field indicators. Although this information has utility in helping delineators understand the landscape and subject site, it is not useful for regulatory agency reviewers of delineation reports. If a delineator feels this information is an essential part of their report, we suggest it be included as an appendix. The appropriate level of soils information for delineation reports includes:

a. Web Soil Survey map, obtained at http://websoilsurvey.nrcs.usda.gov/, overlaid on a recent aerial photograph, with a legend showing the names of the soil mapping units within the area of interest
b. Respective percentage of soil components within the map unit(s) (polygons on the soil map) and their hydric rating (see "Hydric Rating" discussion below in Section 3.5.1).
c. Potential wetland soils from the WDNR Surface Water Data Viewer website. (dnr.wi.gov, search keyword SWDV).

Information about the soils can also be obtained from the WDNR Surface Water Data Viewer website (dnr.wi.gov, search keyword SWDV).

NRCS has developed local lists of map units that contain hydric soils for each county, parish or soil survey area in the United States. These local lists are available at the NRCS State Office, local NRCS field offices, and at the Electronic Field Office Technical Guide for each county at http://efotg.sc.egov.usda.gov/efotg_locator.aspx and are the preferred lists for use in making preliminary wetland determinations. The information is also available on the Web Soil Survey. The National List is compiled once a year and is available at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

3.5.1 Hydric Rating

After obtaining the soils mapping from the Web Soil Survey, a soil's detailed hydric rating can be obtained through the "Soil Data Explorer" under the "Soil Reports" tab. The "Soil Reports" tab is preferred as it provides sufficient detail for a wetland delineation report.

1. At "Soil Reports", click on "Land Classifications"
2. Choose "Hydric rating by map unit (5 categories)" and
3. Select the "Include Minor Soils" option (also known as 'inclusions').
4. Click "View Soil Report" and the report will provide the hydric ratings based on the percentage of a soil map unit that is hydric.

Additional information on which components of a map unit are hydric can be obtained from the Web Soil Survey "Hydric Soils" report, also under "Land Classifications." (**NOTE**: For wetland delineation, DO NOT USE the generalized hydric rating provided from the "Suitabilities and Limitations for Use" tab.)

The *Hydric Soil Category* is an updated rating that indicates the proportion of a map unit meeting the criteria for hydric soils. These ratings provide indicators of where potential wetlands are located, and should be evaluated prior to conducting a wetland delineation site visit. Map units are composed of one or more components or soil types, each of which is rated as hydric or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of non-hydric soils may have small areas of minor hydric components (i.e., inclusions) in the lower positions on the landform. Each map unit is designated as "all hydric," "predominantly hydric," "partially hydric," "predominantly non-hydric," "not hydric," or "unknown hydric," depending on the rating of its respective components.

- **All hydric** means that all components listed for a given map unit are rated as being hydric.
- **Predominantly hydric** means that more than 66 percent (i.e., $\geq$ 67%) to less than 100 percent of components are hydric.
- **Partially hydric** means that more than 33 percent to less than 67 percent of components are hydric.
- **Predominantly nonhydric** means that more than 0 percent and less than 34 percent (i.e., $\leq$33%) of components are hydric.
- **Nonhydric** means that all components are rated as not hydric.
- **Unknown hydric** indicates that at least one component is not rated so a definitive rating for the map unit cannot be made.

PLEASE NOTE: In Wisconsin, at the time of this publication, data supporting the above *Hydric rating by map unit (5 categories)* has not been updated for all counties. Therefore, the "nonhydric" ratings described above may be inconclusive. For this reason, use of the local county lists is preferred until all areas of the state have been updated.

Although soil mapping is a valuable tool for determining where potential wetlands are located, please note that maps are abstracts of reality and field verification is required to determine the presence of wetlands, as well as field indicators of hydric soils. The soil mapping described above is only to be used as an indicator of where potential wetland/hydric soils may be located, and is not accurate enough to be used for determining the presence or absence of a wetland.

3.5.2 Guidance on Field Indicators of Hydric Soils

If soils are wet enough for a long enough period of time to be considered hydric, they typically exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Vasilas, Hurt, and Noble, 2010). This publication provides a description of regional indicators used on the soils portion of the data sheets. These Field Indicators are incorporated for use in the regional supplements. The following provides additional guidance on the use of the Field Indicators in Wisconsin:

a. **Indicators are subject to revision**: Revisions to the most recent published version are implemented through "errata", issued by NRCS. At this writing, Version 7.0 of the USDA Field Indicators (2010) is the most current published version. Errata to V. 7.0 (found under "Links" at http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/) were issued in July 2011 and March 2013.

    1. Among the changes cited in the errata, indicator F21 replaced TF2. This change is significant for delineators working in areas with red parent material soils. To provide geographic context for F21, guidance was developed:

    Red parent material soils are inherently problematic because they are less likely to show redoximorphic color patterns associated with reducing soil conditions. F21 requires that the soils have CCPI values below 30. CCPI refers to the Color Change Propensity Index as described by Rabenhorst and Parikh in the Soil Science Society of America Journal 94:1904-1910 (2000). Regional Supplements to the Corps Manual list F21 for use for problem red parent material soils in LRR K. NRCS soil scientists for Wisconsin recommend the following geographic use of F21:

    Red parent materials with CCPI values below 30 are likely to be encountered in red glacial material near Lake Superior, in Minnesota and Wisconsin, and in eastern Wisconsin, near Lake Michigan. All these areas are in LRR K.

    2. The errata changed the application of indicator S7 from "testing" in our regions (K and M) to regular use in our regions.

    S7. Dark Surface. *For use in LRRs K, L, M, N, P, R, S, T, U, V and Z.* A layer 10 cm (4 inches) thick, starting within the upper 15 cm (6 inches) of the soil surface, with a matrix value of 3 or less and chroma of 1 or less. At least 70 percent of the visible soil particles

must be masked with organic material, viewed through a 10x or 15x hand lens. Observed without a hand lens, the particles appear to be close to 100 percent masked. The matrix color of the layer directly below the dark layer must have the same colors as those described above or any color that has a chroma of 2 or less.

User Notes: For this indicator, the content of organic carbon is slightly less than is required for "mucky." An undisturbed sample must be observed. Many wet soils have a ratio of about 50 percent soil particles that are masked with organic matter and about 50 percent unmasked soil particles, giving the soils a salt-and-pepper appearance. Where the coverage is less than 70 percent, a Dark Surface indicator does not occur.

A word of caution concerning the use of S7 in Wisconsin: A number of soil scientists in our regions have observed that both hydric and non-hydric sandy soils in Wisconsin meet this indicator. Wetland delineations using this indicator should be tempered accordingly with more reliance given to landscape position, hydrology and vegetative indicators.

3. Another change cited in errata, new indicator S11 was developed. This change is significant for delineators working in areas along the shore regions of the Great Lakes.

   S11. High Chroma Sands. *For use along shorelines and near shore regions of the Great Lakes in LRRs K and L.* In coastal zones and dune-and-swale complexes, a layer 2 inches (5 cm) or more thick starting within 4 inches (10 cm) of the surface with chroma 4 or less and 2% or more distinct or prominent redox concentrations.

   User Notes: Along the shorelines of the Great Lakes within LRRs L and K, some wetlands exhibit the presence of high chroma sands (often a chroma of 3 or more). These high-chroma, sandy soils occur at the landward edge of coastal marshes, in interdunal landscape positions, and dune-and-swale complexes. These soils exhibit redox concentrations as pore linings and/or soft masses starting within 4 in. (10 cm) of the surface. In adjacent upland areas, redox concentrations are absent or are only observed below 6 in. (15cm). It may be helpful to involve a soil scientist or wetland scientist familiar with these soils.

b. The title alone of the hydric soil indicator does not fully describe the requirements: It is important that delineators read the entire "Technical Description" of the hydric soil field indicators to determine the depth and morphology requirements of the indicator. In particular, field indicators A11 and A12, which both mention "Dark Surface" in their title, require observation of a depleted matrix below the dark surface; for A12, this may mean digging well below the typical 18"-24" soil pit to confirm observation of a depleted matrix.

c. A soil profile meets or does not meet an indicator: There is no 'almost meets an indicator' category. A data sheet that indicates a hydric soil indicator(s) has been met must have an associated soil profile description with depths, colors, textures and so forth that match the morphology required by the indicator(s). The "Remarks" section of the soils data sheet should be used to provide additional information to support cases where a hydric soil determination is based on best professional judgment, such as when employing the "Problematic Hydric Soils"

procedures in Chapter 5 of a regional supplement. When using best professional judgment, the delineator should indicate this by selecting the "Other" box, and explain in the remarks section why they feel an area meets the hydric soil criteria even though a field indicator was not encountered.

d. **Observing more than one hydric soil indicator is common:** Although only one hydric soil indicator is needed to confirm that a hydric soil is present, the practice of identifying all indicators observed adds additional support to the interpretation of a soil profile and provides information useful to reviewers.
e. **Test Indicators**: A wetland delineation relying on test indicators of hydric soils, or indicators for use with problem soils as they are called in Chapter 5 of the regional supplements, should be augmented with additional documentation including landscape position.
f. **Depth to Sample**: Professional judgment is involved when deciding the depth used to determine whether a soil is hydric. The regional field indicators for hydric soils provide that the appropriate depth to sample is that by which a determination can be made whether or not a soil meets a field indicator. In general, soil pits should be a minimum depth of 20 inches to allow for: (1) observation of an adequate portion of the soil profile to determine if the soil meets a field indicator; (2) observation of hydrology including depth to the water table and saturated soils; and (3) identification of disturbances such as a buried horizon, plow zone, etc. Some soils, such as Mollisols common in Wisconsin, may require sampling deeper than 20 inches in order to observe indicators below the deep, dark surface horizon. Also, during portions of the dry season or drier than normal periods (see Growing Season discussion above), the soil pit may need to be at least 24 inches deep in order to provide for observation of Hydrology Indicator C2 – Dry season water table.
g. **Field indicators are "test positive."** Failure to meet a field indicator does not necessarily mean the soil is not hydric because field indicators have not been developed for all hydric soils. If indicators of wetland hydrology and hydrophytic vegetation are present, professional judgment should be used to apply the procedure in Chapter 5 of the regional supplements on difficult hydric soil interpretations.

3.6 Vegetation Guidance

Proper plant identification is essential for accurate wetland delineation in accordance with the current Manual and supplements. Appendix D provides a list of botanical references for use in Wisconsin. Additional plant identification sources can be found on the University of Wisconsin Green Bay Cofrin Herbarium and Southeast Wisconsin Regional Planning Commission websites at: http://www.uwgb.edu/biodiversity/herbarium/plant_references01.htm, or http://www.sewrpc.org/SEWRPC/NaturalResources/LinksandDocumentDownloads.htm

3.6.1 Recording vegetation data

All plant species observed in a particular sampling plot should be recorded on the corresponding data form, with at least 80% of areal cover identified to species; all dominants need to be identified to species level. If a species is unknown or unidentifiable, it should be identified as such on the data form. If a particular species is present due to planting, cultivation, mowing, grazing, or some other anthropogenic factor, then that should be noted on the data form and considered in the hydrophytic determination. Delineators should follow the hydrophytic vegetation testing sequence in the supplements using the indicator values in the NWPL. In those instances when wetland hydrology and hydric soil parameters are

met, but planted vegetation is skewing the results of a data plot, refer to the procedures for analyzing difficult vegetation outlined in Chapter 5 of the supplements.

3.6.2 Subregions of the NC/NE Supplement

The Northcentral/Northeast Region was broken into two subregions, the western half of which, known as the North Central Great Lakes subregion, includes the area of Wisconsin covered by the NC/NE Regional Supplement (see Figure 9). Two species, quaking aspen (*Populus tremuloides*) and common red raspberry (Rubus idaeus), were assigned a differing indicator status in the North Central Great Lakes sub-region (FAC) as compared to the remainder of the NC/NE region (FACU). For delineating wetlands in Wisconsin, the indicator status from the North Central Great Lakes subregion supersedes those from the NC/NE region.

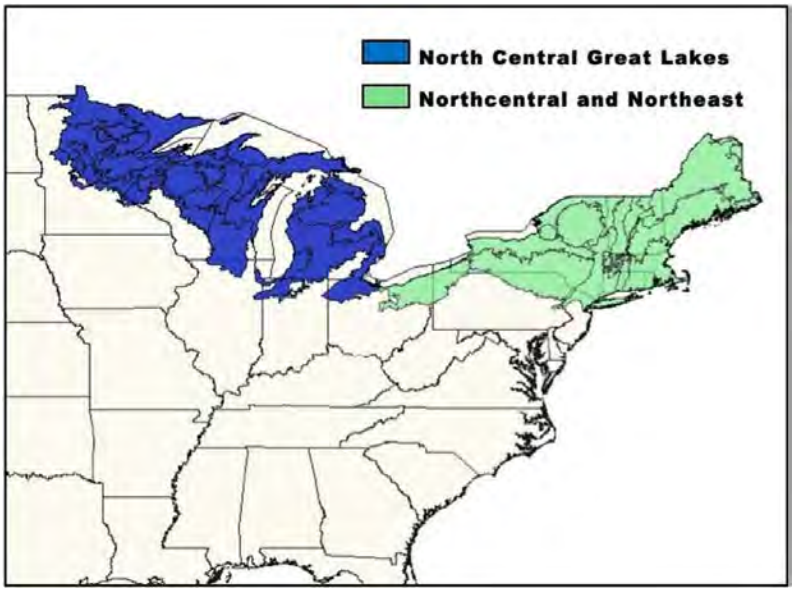

Figure 9. Subregions of the Northcentral/Northeast Regional Supplement

3.7 Hydrology Guidance

3.7.1 Documentation

Hydrology, or the presence of water, is the driving force for wetlands and aquatic resources. Hydrology is also the most variable of the three mandatory criteria used to identify wetland areas as it is subject to daily, seasonal, annual and longer-term fluctuations such as multi-year drought and wet cycles. Furthermore, site visits are often conducted outside of the “wet” season (e.g., April-May), as well as during drought years, meaning that direct observation of inundation or saturation may not be made on the day of the site visit, or during short-term observation (three-years or less) of monitoring wells. Therefore, the 1987 Manual and the supplements utilize a variety of indicators to verify the presence of hydrology, a recent hydrologic event or evidence of long-term wetland hydrology. Using the supplements, the observation of one primary or two secondary indicators is sufficient to conclude that wetland hydrology is present. In addition, indicators of wetland hydrology are not limited to those listed in the regional supplements; other evidence of wetland hydrology, such as presence of an indicator from a different regional supplement, may also be used with appropriate documentation.

Hydrology indicators themselves are often ephemeral. Observation of surface water may only be present during the wet portion of the growing season in normal precipitation years for some wetlands. The question for wetland delineators is not whether a site has wetland hydrology on a given day or during a given growing season, but whether there are sufficient indicators that provide evidence that the site has a continuing wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a past hydrologic regime. The criteria do not require that wetland basins or the upper boundary of wetlands be inundated or saturated to the surface every year, recognizing the dynamic nature of wetlands. Therefore, once a wetland hydrology indicator is observed, it is an indicator and should be noted on the data form and in the delineation report. Subsequent observations with a different result do not cancel out the earlier observation, but provide context for understanding normal climatic variations.

It is important to adequately document the presence/absence of water above, at or near the ground surface during field observations. The presence of primary indicators such as surface water or water within 12 inches of the surface must be accompanied by data on the exact depth below or above the ground surface measured at the time of sampling. Even if water is observed below the depth to meet an indicator or not observed at all, the depth to water table or depth to bottom of sampling pit (usually provided in soil profile description) must be recorded.

Unlike vegetation and soil sampling, many of the hydrology indicators are not associated with a specific sampling area or point. Delineators must use professional judgment in evaluating indicators at chosen sample points. For example, observation of a crayfish burrow (secondary indicator) should not be discounted simply because it is not located exactly at the location of the soil pit or within the vegetation sampling plot. If the burrow is readily observed near the sampling location in an area with similar vegetation, soils and landscape position as the sample plot, then it should be recorded on the data form as a secondary indicator.

It is also important to consider hydrology indicators from abutting regional supplement areas. In Wisconsin this means considering the wetland hydrology indicators described in both the Midwest and NC/NE regional supplements. The tables provided in Appendix A list the indicators for use in each regional supplement. Use of an indicator from an abutting supplement should be used where applicable, and must be supported with adequate documentation and justification for why the indicator applies.

3.7.2 Dry Season Water Table – Hydrology Indicator C2

The normal 'dry season' is recognized as starting when evapotranspiration rates exceed precipitation values (typically beginning near the end of June for Wisconsin). Refer to the monthly evapotranspiration rates at the following National Oceanic and Atmospheric Administration (NOAA) website:

http://www.cpc.ncep.noaa.gov/soilmst/eclim_frame/html

NRCS soil survey water table data was also analyzed to obtain reasonable dates for the start of the normal 'dry season' for the Land Resource Regions (LRR) in Wisconsin, which are generally set as follows:

LRR M (Midwest): July 15
LRR K (Northcentral/Northeast): August 1

Of course, the dates will vary slightly depending upon antecedent precipitation conditions. Data collection during site visits conducted after these dates, or during abnormally dry (drought) conditions, may need to include soil pits dug to at least 24 inches (60 cm) in order to allow for observation of the water table between 12 and 24 in. (30 and 60 cm) below the surface.

This indicator is also applicable in the early part of the growing season during years that immediately follow extreme drought conditions. Online tools such as Palmer Drought Severity Index or the USGS Waterwatch should be consulted when making determinations related to use of the C-2 Hydrology Indicator.

3.7.3 Antecedent Precipitation

Field observations and conclusions must consider antecedent precipitation conditions. Refer to the following guidance document "Accessing and Using Meteorological Data to Evaluate Wetland Hydrology" (http://el.erdc.usace.army.mil/elpubs/pdf/wrap00-1/wrap00-1.pdf) and "Hydrology Tools for Wetland Determinations" (http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17556.wba).

The Wisconsin State Climatology Office website (http://www.aos.wisc.edu/~sco/data_links.html) provides links to climate data for determining the antecedent precipitation.

Longer term drought conditions should also be considered using the USGS Waterwatch website (http://waterwatch.usgs.gov/), Palmer Drought Severity Index (http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/palmer.html), or other available tools.

Antecedent conditions should be documented in the delineation report, although tables of annual precipitation data are not needed. A summary of antecedent conditions (generally three months prior to site visit) based on procedures in the recommended guidance documents is adequate in most circumstances.

3.7.4 Using Aerial Imagery to Assess Wetland Hydrology

The interagency approach to off-site wetland determinations on agricultural lands (also referred to as the state "Mapping Conventions" provided in Appendix E) using FSA slide review, or other acceptable aerial photography, is **required**.

These procedures are most useful for interpreting wetland hydrology in agricultural areas, however, they can be useful in other situations (with appropriate caution) where hydrology is in question. In general, review of aerial imagery for assessing wetland hydrology is more accurate in agricultural fields that have been planted with annually seeded row crops such as soybeans and corn. These fields will often show signs of crop stress, standing water, or drowned out crops in summer aerial imagery when wetland hydrology is present. An aerial imagery review for signs of crop stress due to wetness is typically not as reliable for fields planted in perennial forage crops compared to those planted to row crops. There are some situations where air photo review can provide useful information in areas that are not cropped or hayed such as pastures and naturally vegetated seasonally flooded/saturated wetlands. However, greater emphasis should be placed on other data sources (such as those listed in the Corps Manual and supplements) in these situations.

Please note: Wetland determinations conducted by USDA for Food Security Act purposes are not acceptable for use as wetland delineations; while they may provide information to guide in collecting data, they are not reliable for boundary decisions.

3.7.5 Monitoring well guidance

On sites where the hydrology has been manipulated (e.g., with ditches, subsurface drains, dams, levees, water diversions, land grading) or where natural events (e.g., down-cutting of streams) have altered conditions such that hydrology indicators may be missing or misleading, direct monitoring of surface and

groundwater may be needed to determine the presence or absence of wetland hydrology. The U. S. Army Corps of Engineers (2005) provides minimum standards for the design, construction, and installation of water-table monitoring wells, and for the collection and interpretation of groundwater monitoring data, in cases where direct hydrologic measurements are needed to determine whether wetlands are present on highly disturbed or problematic sites. The technical standard requires 14 or more consecutive days of flooding, ponding, and/or a water table 12 in. (30 cm) or less below the soil surface, during the growing season, at a minimum frequency of 5 years in 10 (50% or higher probability) unless an alternative standard has been established for a particular region or wetland type (none in Wisconsin). A disturbed or problematic site that meets this standard has wetland hydrology. This standard is not intended (1) to overrule an indicator-based wetland determination on a site that is not disturbed or problematic, or (2) to test or validate existing or proposed hydrology indicators[2]. Typically a site will require a minimum of five years of monitoring, and may require ten or more years depending on climatic conditions and results of the data collection. Shorter monitoring times are often inaccurate, and may lead to incorrect determinations related to fulfillment of the wetland hydrology criteria.

Numerous guidance documents have been developed and remain relevant for installation and interpretation of monitoring wells, including the District 2006 *Guidance on Design, Installation and Interpretation of Monitoring Wells for Wetland Hydrology Determinations* (http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/guidance_design.pdf).

Note: Based on experience since the above guidance was written, the final bullet on page 2 of this document should read that the "driven method" for installing wells in organic soils should be used with caution. With sapric organic soils, it is better to auger and backfill with the native organic soils, the driven method can smear organic soils and create a seal along the walls of the bore hole.

Additional guidance documents relating to wetland hydrologic monitoring can be found in Appendix F.

[2] Chapter 5, Regional Supplements

LIST OF APPENDICES

APPENDIX A – A COMPARISON OF HYDROLOGY AND HYDRIC SOIL FIELD INDICATORS BETWEEN SUPPLEMENTS

APPENDIX B – Checklist for complete delineation report (WDNR)

APPENDIX C – NORMAL CIRCUMSTANCES DETERMINATIONS FLOW CHART

APPENDIX D – BOTANICAL REFERENCES

APPENDIX E – STATE MAPPING CONVENTIONS FOR WISCONSIN

APPENDIX F – HYDROLOGIC MONITORING REFERENCES

APPENDIX A
HYDROLOGY AND HYDRIC SOIL FIELD INDICATORS IN WISCONSIN

Table 1. Hydrology Indicators used in Wisconsin

Hydrology Indicator	Midwest Category		Northcentral - Northeast Category	
	Primary	Secondary	Primary	Secondary
Group A – Observation of Surface Water or Saturated Soils				
A1 – Surface Water	X		X	
A2 – High Water Table	X		X	
A3 - Saturation	X		X	
Group B – Evidence of Recent Inundation				
B1 – Water Marks	X		X	
B2 – Sediment Deposits	X		X	
B3 – Drift Deposits	X		X	
B4 – Algal mat or crust	X		X	
B5 – Iron Deposits	X		X	
B6 – Surface soil cracks		X		X
B7 – Inundation visible on aerial imagery	X		X	
B8 – Sparsely vegetated concave surface	X		X	
B9 – Water-stained leaves	X		X	
B10 – Drainage patterns		X		X
B13 – Aquatic fauna (invertebrates in GP)	X		X	
B14 – True aquatic plants	X		Not in NC/NE	
B15 – Marl deposits	Not in MW		X	
B16 – Moss trim lines	Not in MW			X
Group C – Evidence of Current or Recent Soil Saturation				
C1 – Hydrogen sulfide odor	X		X	
C2 – Dry-season water table		X		X
C3 – Oxidized rhizospheres along living roots	X		X	
C4 – Presence of reduced iron	X		X	
C6 – Recent iron reduction in tilled soils	X		X	
C7 – Thin muck surface	X		X	
C8 – Crayfish burrows		X		X
C9 – Saturation visible on aerial imagery		X		X
Group D – Evidence from Other Site Conditions or Data				
D1 – Stunted or stressed plants		X		X
D2 – Geomorphic position		X		X
D3 – Shallow aquitard	Not in MW			X
D4 – Microtopographic relief	Not in MW			X
D5 – FAC-neutral test		X		X
D9 – Gauge or well data	X		Not in NC/NE	

Table 2. Field Indicators of Hydric Soils used in Wisconsin[3]

Field Indicator	Midwest (LRR M)	Northcentral/Northeast (LRR K)
All Soils		
A1: Histosol	X	X
A2: Histic Epipedon	X	X
A3 – Black Histic	X	X
A4 – Hydrogen Sulfide	X	X
A5 – Stratified Layers	X	X
A10 – 2 cm Muck	X	D
A11 – Depleted Below Dark Surface	X	X
A12 – Thick Dark Surface	X	X
A16 – Coast Prairie Redox	D	D
Sandy Soils		
S1 – Sandy Mucky Material	X	X
S3 – 5 cm Mucky Peat or Peat	X	D
S4 – Sandy Gleyed Matrix	X	X
S5 – Sandy Redox	X	X
S6 – Stripped Matrix	X	X
S7 – Dark Surface	X	X
S8 – Polyvalue Below Surface	Not in MW	D
S9 – Thin Dark Surface	Not in MW	D
S11 – High Chroma Sands	Not in MW	X
Loamy and Clayey Soils		
F1 – Loamy Mucky Mineral	X	X
F2 – Loamy Gleyed Matrix	X	X
F3 – Depleted Matrix	X	X
F6 – Redox Dark Surface	X	X
F7 – Depleted Dark Surface	X	X
F8 – Redox Depressions	X	X
F10 – Marl	Not in MW	X
F12 – Iron-Manganese Masses	D	D
F21 – Red Parent Material	Not in MW	D
TF12 – Very Shallow Dark Surface	D	D

X = Recognized by the National Technical Committee for Hydric Soils (NTCHS) for general use within geographic area of supplement

D = not recognized by NTCHS for general use within geographic area of supplement, but may be used in difficult wetland situations for that supplement area where there is evidence of wetland hydrology and hydrophytic vegetation, and the soil is believed to meet the definition of hydric soil despite the lack of other indicators of a hydric soil.

[3] Incorporates errata from 2011 and 2013

APPENDIX B
WETLAND DELINEATION CHECKLIST

WETLAND DELINEATION CONFIRMATION REQUEST CHECK LIST
WDNR WETLAND IDENTIFICATION PROGRAM

The following is the preferred order for all information provided in wetland delineation reports submitted for wetland confirmation. Please include this completed checklist with all wetland delineation report submittals. All of the following must be included with all wetland delineation reports that are submitted for confirmation:

____ **Introductory Section**

- Why the delineation was undertaken
- Date the field work was completed
- Who conducted field work
- Qualifications

____ **Methods used during the wetland delineation**

- Description of methods
- Sources Reviewed (WWI mapping, Soil Survey, etc.)
- Description of any site specific agency guidance (site meetings, etc.)

____ **Results and Discussion**

- Antecedent hydrologic condition analysis
- Previous wetland delineation mapping
- Existing environmental mapping (WWI mapping, Soil survey, etc.)
- Amount and types of wetland located within the project area
- Discussion explaining how the wetland/upland boundary was differentiated
- Disturbed and problematic areas encountered during the delineation
- Other water resources located in the project area (navigable streams, etc.)

____ **Topographic mapping** (Include map scale, clearly identified review area, a north arrow)

____ **WWI mapping** (Include map scale, clearly identified review area, a north arrow)

____ **Soil Survey mapping** (Include map scale, clearly identified review area, a north arrow)

____ **Wetland Delineation Map** showing an accurate depiction of wetland boundaries and data points identified during field investigation (Include map scale, clearly identified review area, a north arrow)

____ Complete, legible wetland delineation **data forms** from the appropriate regional supplement

____ **Site photos**

____ Any previous delineation information

____ **Areas that are currently, or were recently (less than three years prior to the delineation) under agricultural production must include a Farm Service Agency (FSA) Slide Review.** All FSA Slide Reviews should include the following:

- Copies or photos of slides if available
- A completed wetland documentation form (NRCS form NRCS-CPA-32W)
- A copy of the draft NRCS Wetland Inventory map if available

____ **Literature Cited**

Please include this completed checklist with all wetland delineation report submittals.

APPENDIX C
NORMAL CIRCUMSTANCES DETERMINATIONS FLOW CHART

St. Paul District
REGULATORY
US Army Corps of Engineers

Normal Circumstances Determinations

Indicators of one or more of the 3 parameters are absent, obscured, or misleading

No

Sample point is not a "Problem Area" or "Disturbed", or it is a "Problem Area" (based on natural variability) observed during the normal wet season.
Record observations on data form.

Yes

The sample point is upland.
Record observations on data form.

Normal Circumstances present.
Check "Yes" on data form.

Conditions indicate:
1) human-caused disturbance (e.g., filling, ditching, tiling, diking, cropping, planting, logging, mowing, land clearing, groundwater extraction, excavation, impoundment), and/or
2) significant to catastrophic natural event (e.g., change in river course).

Conditions indicate either:
1) natural, normal, seasonal or annual variability (e.g., dry season, vernal pools), or
2) permanently absent parameter(s) due to the nature of the soils or plant species on the site (e.g., red parent material, FACU-dominated)

Disturbed (Atypical Situation):
Indicate Veg/Soils/Hydrology are 'significantly disturbed' on data form.

Problem Area (Naturally Problematic):
Indicate Veg/Soils/Hydrology are 'naturally problematic' on data form.

Note: a sample point can be both a disturbed (atypical situation) and problem area.

Normal Circumstances MAY NOT be present.
Analyze authorization, purpose, extent and relative permanence of disturbance to determine if new normal circumstances have been established.
Record observations on data form.
Check "No" on data form as appropriate.

Normal Circumstances present, if not also disturbed.
Confirm disturbed conditions are not present.
Record observations on data form.
Check "Yes" on data form as appropriate.

APPENDIX D
BOTANICAL REFERENCES FOR USE IN WETLAND DELINEATION

Botanical References

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Petrides, George. 1972. *A Field Guide to Trees and Shrubs*. Houghton Mifflin Company, Boston, Mass. 428 pp.

Smith, Welby. 1993. *Orchids of Minnesota.* University of Minnesota Press, Minneapolis, Minnesota. 172 pp.

Smith, Welby. 2008. *Trees and Shrubs of Minnesota*. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Swink, Floyd and Gerould Wilhelm. 1994. *Plants of the Chicago Region.* The Morton Arboretum, Lisle, Illinois. 921 pp.

Tryon, Rolla. 1980. *Ferns of Minnesota*. University of Minnesota Press, Minneapolis, Minnesota.165 pp.

Voss, Edward. 1972. *Michigan Flora. Part I - Gymnosperms and Monocots.* Cranbrook Institute of Science, Bloomfield Hills, Michigan and the University of Michigan Herbarium. 488 pp.

Voss, Edward. 1985. *Michigan Flora. Part II – Dicots (Saururaceae—Cornaceae).* Cranbrook Institute of Science, Bloomfield Hills, Michigan and the University of Michigan Herbarium. 724 pp.

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APPENDIX E
STATE MAPPING CONVENTIONS
FOR
WISCONSIN

WISCONSIN WETLAND MAPPING CONVENTIONS
USDA, NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

May 1, 1998

INTRODUCTION

This document outlines the off-site procedures and methods that NRCS will use in Wisconsin to help identify and delineate wetlands for the Food Security Act of 1985 (FSA) as amended by FACTA (1990) and FAIRA (1996). These off-site procedures will be used in conjunction with on-site methods when delineating wetlands for Clean Water Act (CWA) Section 404 purposes and in accordance with the Federal Interagency Memorandum of Agreement (MOA).

Mapping conventions are a set of procedures used to guide trained delineators in making wetland determinations on agricultural lands. These conventions were designed to assure statewide consistency among all users and were completed with guidance from an interagency team and revised according to the Midwest Regional Wetland Team recommendations. For the purposes of this manual only, a "determination" identifies an area as wetland or non-wetland and a "delineation" identifies the boundary.

GENERAL INFORMATION

The size of an area is not part of the wetland criteria. All areas which meet the determination criteria and are large enough to delineate on aerial photography, when using these conventions, will be mapped. The base map is a single section Farm Service Agency aerial photo and is usually at a scale of 8 inches to the mile. FSA wetland symbols and definitions used here are listed in the most current version of the National Food Security Act Manual (NFSAM).

While NRCS will only complete certified determinations on-site, use of these off-site mapping conventions is a valuable tool on frequently cropped sites prior to the on-site visit. The final delineation will be the field (on-site) evaluation.

WISCONSIN NRCS WETLAND MAPPING CONVENTIONS

The three landscape conditions occurring in Wisconsin are the Glaciated Region, the Driftless Area **(Exhibit #1)** and alluvial lands. The landscape features which will be used are:

1) Potholes and other depressional areas. Depressions are low areas in the landscape which may contain wetlands. Potholes are closed depressions in glaciated areas.
2) Flooded or ponded soils* that are inundated during the growing season.** These conditions may exist along drainageways, streams, rivers, lakes, or in depressional areas.
3) Hydric soils that only meet saturation criteria.

*Ponding is temporary inundation in a closed depression and flooding is temporary flowing water in drainageways and adjacent to streams.
**Using air temperature data from county soil surveys, the Growing Season can be approximated as the period of time between the average date (5 years in 10) of the last killing frost (28°) in the spring to the average date of the first killing frost (28°) in the fall.

These Conventions are to be used for all three landscape features. The only difference is in the pothole vs. non-pothole Farmed Wetland (FW) hydrology criteria requirements (see below).

HYDROLOGY REQUIREMENTS

a) For all non-manipulated areas, (plus FWP and pothole FW), soils must have 7 day ponding/flooding or 14 day saturation, during the growing season for greater than a 50% chance of occurrence each year (5 out of 10 years) to meet wetland hydrology criteria.

b) Non-pothole cropland, manipulated prior to 12/23/85, must have 15 consecutive day ponding/flooding during the growing season for greater than a 50% chance of occurrence each year (5 out of 10 years) to meet FW hydrology criteria. Less than 15 ponding/flooding is PC.

MAPPING TOOLS

The principal tools used to make the wetland determination are:

1) **NRCS and WDNR wetland maps**

These inventories give an excellent overview of wetlands in the area. Wetlands identified on either inventory will be considered wetland and will be transferred to the preliminary base map. Minimum size of delineations on WWI maps are >2 or >5 acres (**Exhibit #2**). "Point symbol" determinations on WDNR maps identify wetlands. Due to the policy of the time, some NRCS maps do not show PC areas, and some WDNR WWI maps did not inventory cropland wetlands.

2) **Soil Survey and County Hydric Soils List**

Soil maps identify potential areas for wetlands. Look for:

a. Map units which are listed as hydric soils for the county.
b. Map units with hydric soils as part of their name.
c. Map units with hydric soils as inclusions. **Note**: Wetlands can occur on almost any non hydric soil map unit. If wetlands are clearly evident on soils not on the list, they will be mapped.
d. Conventional water feature symbols such as marsh or swamp, wet spot, stream, etc.

3) **Flood Hazard Study Maps**

Flood elevation boundaries are delineated for 10 and 50 year flood events along streams in some areas. These boundaries were derived from historical and stream gauge data. "Hydrology Tools-NEH-650-19" contains procedures to estimate the extent and duration of flooding and ponding.

4) **Wetness Evaluation Tables (precipitation data)**

These Tables list the actual precipitation for the months of April through August for the years 1979 through 1996. It also has calculated the wetness condition for the months of April through June of the given year as "Dry," "Normal," and "Wet".
a. Identify the climate station closest to the site.
b. Select all the "Normal" year FSA color slides (minimum of 5) for review. An equal number of "Wet" and "Dry" years are also to be used. The "Wet" and "Dry" years will be ranked. according to their total precipitation, using those closest to "Normal" first (1988 and 1993 would be used last).

5) **Farm Service Agency Color Aerial Slides**

The slides are usually taken in July. Review all slide years for indications/signals that wetland hydrology has caused stress in the planted crop. Concentrate your review on the "Normal" precipitation years. While wetness signals may not appear every year, they should reflect the overall hydrology of the area during that time period.

A wetland signature is the indication left in a field, recorded by a photograph, of ponding, flooding, or impacts of saturation for sufficient duration that meets wetland hydrology and possibly wetland vegetation criteria. Wetland signatures in cropland for Wisconsin are:

a. Hydrophytic vegetation (seen as a different color of green)
b. Surface water (usually black or white)
c. Drowned-out crops (bare soil or mud flats)
d. Differences in color due to different planting dates or isolated areas not farmed with the rest field.
e. Inclusion of wet areas in set-aside program
f. Patches of greener color in "dry" years
g. Crop stress (yellow) or sparse canopy (light green)
h. Saturated soil visible on infrared (IR) slides or photos.

6) Other

USGS topographic maps; old aerial photographs; color infrared photography; and previous on-site delineations by NRCS, COE, EPA, WDNR, SEWRPC or private consultants.

The wetland delineator must be trained to interpret the above signatures in each region being mapped. This training should include field verification of the signatures observed.

OFF-SITE MAPPING PROCEDURES

All FSA wetland determinations will begin by using the **off-site** procedures identified below. When in doubt while using these **off-site** conventions, use a wetland bias.

Step 1. - Review NRCS and WDNR wetland inventory maps. All delineations on these maps will be transferred to the base map.

Step 2. - Review the Soil Survey for hydric soil map units, areas with hydric soil inclusions (usually areas with dark soil tones) and conventional water feature symbols. Transfer uncropped hydric soils to the base map as potential wetland.

Step 3. - Review all available aerial photography and topo maps.

Step 4. - Review all Farm Service Agency color aerial slides (Mapping Tools #4 above). When reviewing the slides, document the signatures (Mapping Tools #5 above) on form NRCS-CPA-32W (**Exhibit #3**). Determine the percentage of occurrence of wetness signatures (e.i., 6 out of 10 years = 60%).

Step 5. - Based on the slide review, delineate the slide year having the largest wetland boundary during a "normal" rainfall year, if signatures meet the mapping convention guidelines listed below. (**Note:** The final delineation, with appropriate FSA symbol, will be verified or adjusted during the field visit.)

CROPLAND CONVENTIONS

Use the following guidelines to identify wetlands in cropland:

Wetlands (W) farmed under natural conditions

Delineate areas in crop fields W if they contain hydric soils or soils with hydric inclusions and meet any of the following criteria:

a) 50% or more of the slides show any items (a-h above);

b) 30% of the slides show any items (a-h above), and area is on the WDNR WWI or NRCS wetland inventory; **(Exhibit #4)**

c) Other: wetness "spot" symbols, any on-site data, etc.

This includes abandoned FW, FWP, and NW areas meeting wetland criteria. PC areas cannot be abandoned after December 23, 1985, for FSA purposes BUT may still be considered jurisdictional wetlands by COE and WDNR for CWA-404 and State wetland program purposes.

Farmed Wetlands (FW)

Delineate areas in crop fields FW if they meet criteria a, b, or c, (above) AND show a visible sign of alteration (e.i.,adjacent ditch or tile lines) prior to December 23, 1985. FW areas are subject to abandonment (5 consecutive years without cropping, haying, or management and wetland criteria returns.)

Note: Because of the different hydrology criteria, field verification is extremely important to confirm that the FW definition and criteria is met. FWs (determined off-site), which do not meet the on-site definition and hydrology criteria will become PC. Also, some areas identified off-site as W will be changed to FW with field documentation that drainage and FW hydrology criteria are met. A scope and effect evaluation may be needed to determine the zone of influence to delineate the FW boundary. Areas outside this zone of influence, will be labeled W (farmed under natural conditions).

Farmed Wetland Pasture and Hayland (FWP)

Pasture/hayland will seldom show cropland wetness signatures. Delineate areas as FWP where:

1) the whole soil map unit is hydric **OR**;
2) a delineation appears on the WDNR WWI **AND**;
3) the site shows a visible sign of alteration **AND**;
4) documentation of site being pasture or hayland exists (e.g.-ASCS-578 Crop Acreage Report, testimony, etc.)

Prior Converted Croplands (PC)

Use FSA slide years 1981-1985 for PC determinations. Sites containing hydric soil map units that have been manipulated and cropped before December 23, 1985 and do not meet the wetland signature criteria as described for W and FW will be labeled PC.

The site should be cropped >50% of the time, (3 of 5 years) during normal precipitation years. If cropped only once, field documentation is required to show the site was made croppable.

Crop fields that meet wetland saturation criteria only will be considered PC only if woody vegetation removal can be documented. Without documentation to support the prior existence of woody vegetation, the field will be labeled W (farmed under natural conditions). Examples of documentation can include: old aerial photography (e.g. 1930's); comparing uncropped areas of the same soil map unit and landscape position; personal testimony; and historic vegetation maps.

PC areas cannot be abandoned for FSA purposes after December 23, 1985, if they remain in agricultural use, BUT they still may be considered jurisdictional wetlands by COE and WDNR for CWA-404 and State wetland program purposes.

Non-Wetland (NW)

Land that under natural conditions does not meet wetland criteria (sometimes called upland) will **NOT** be delineated. All areas without a symbol will be considered NW.

NON-CROPLAND CONVENTIONS

Use the following guidelines to identify wetlands in non-cropland:

Wetlands (W)

All Non-Croplands, will be marked as W where:

1. The whole soil map unit is hydric or;
2. A delineation or wet spot symbol appears on the WDNR WWI.

Not Inventoried (NI) lands

All non-hydric soil mapping units will be marked Not Inventoried (NI), and on-site procedures listed in the COE 1987 Manual will be required to determine the wetland status. On any wetland determination or copy of a wetland inventory map given to a client, an explanation of "NI" must be included. This note will state that NI areas may contain wetlands. If any manipulation is planned for this area, a determination should be requested for Farm Bill or CWA-404 purposes.

Other Waters (OW) of the U.S.

"Other Waters (OW) of the U.S" (streams, rivers, ponds, lakes, etc.) will not be delineated by NRCS and will be labeled NI, unless a delineation is provided by COE. (see NFSAM Amendment WI20 Part WI514.26(b))

Converted Wetlands (CW)

For FSA purposes, all sites with wetness signatures, that show visible signs of manipulation, beginning with the 1986 slide, will be shown as converted wetland (CW). Visible signs of manipulation include ditching, tiling, diking, filling, or woody vegetation removal. An on-site evaluation is required to verify the presence of hydric soils and that the area was made croppable. Conversions that occur between 12/23/85 and 11/28/90 are labeled CW. Conversions identified after 11/28/90 are labeled CW+yr. COE will also be notified of a possible CWA violation.

Small, Multiple Wetland Complexes

Some areas contain many, small, scattered wetlands. Delineation of these tiny areas at the present scale of mapping is very difficult and time consuming. Label the entire area "Wi" (Wetland inclusions) to convey that many small wetlands occur in this area and on-site delineation is required.

Artificial Wetland (AW)

Land that was formerly nonwetland under natural conditions, but now exhibits wetland characteristics because of human activities, will be labeled "AW".

QUALITY STANDARDS

NRCS Wetland Specialists and Biologists will periodically conduct quality reviews of wetland delineations to assure statewide quality and consistency. COE, EPA, FWS, and WDNR representatives are encouraged to assist in the reviews.

AGENCY CONCURRENCE

These modifications of the original conventions have been reviewed and are concurred in by representatives of the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Environmental Protection Agency, Wisconsin Department of Natural Resources, and USDA, Natural Resources Conservation Service. These conventions will be used by NRCS to complete wetland determinations and delineations. Additional modifications of these conventions may be made at any time with concurrence of all signatory agencies.

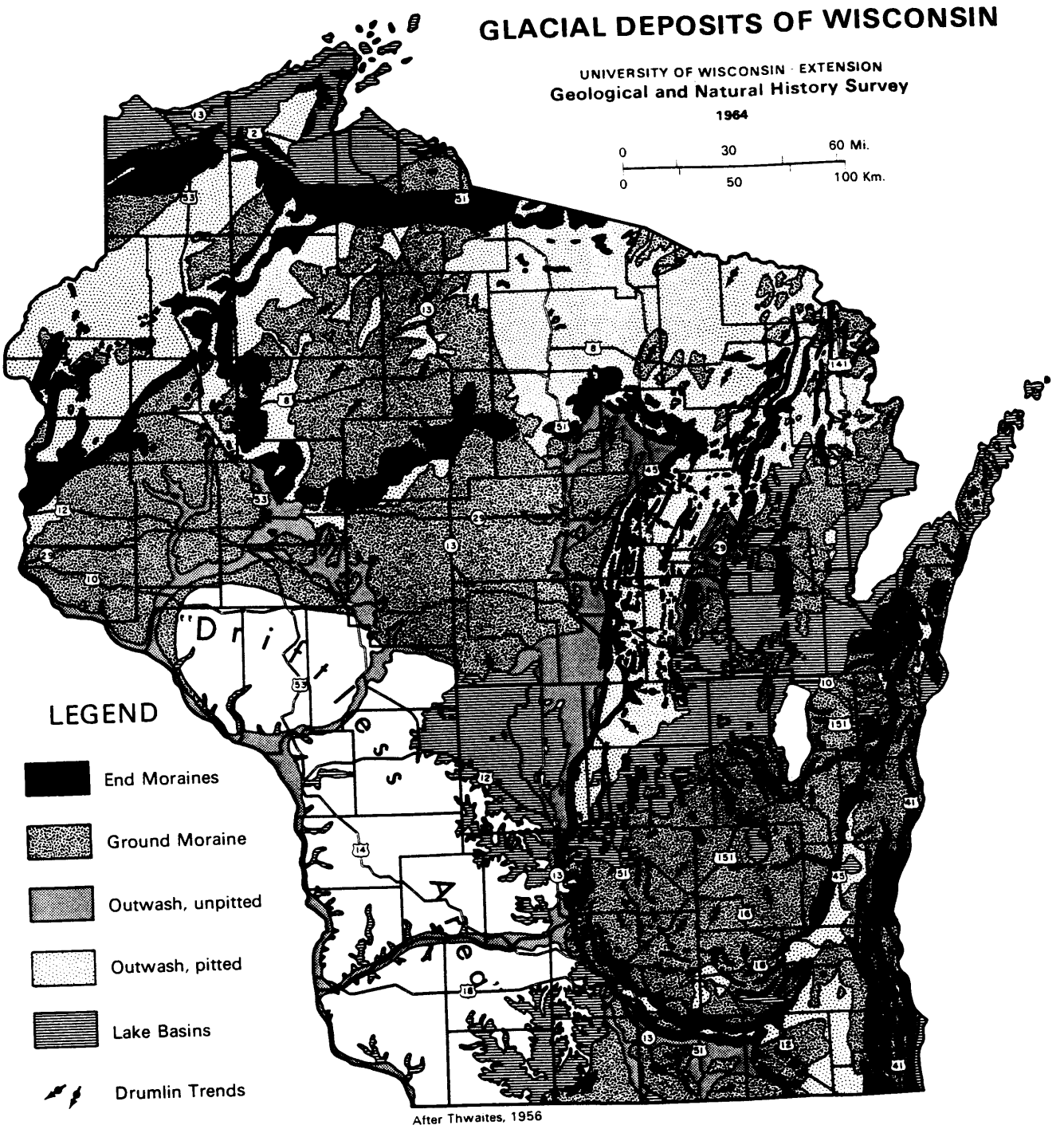
PATRICIA S. LEAVENWORTH
State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service

WILLIAM J. BREYFOGLE
Lieutenant Colonel
US Army Corps of Engineers
District Engineer

KEVIN PIERARD
Watershed & Nonpoint Source Program Branch
US Environment Protection Agency- Region 5

JAMES J. RUWALDT
Private Lands Coordinator
US Fish and Wildlife Service

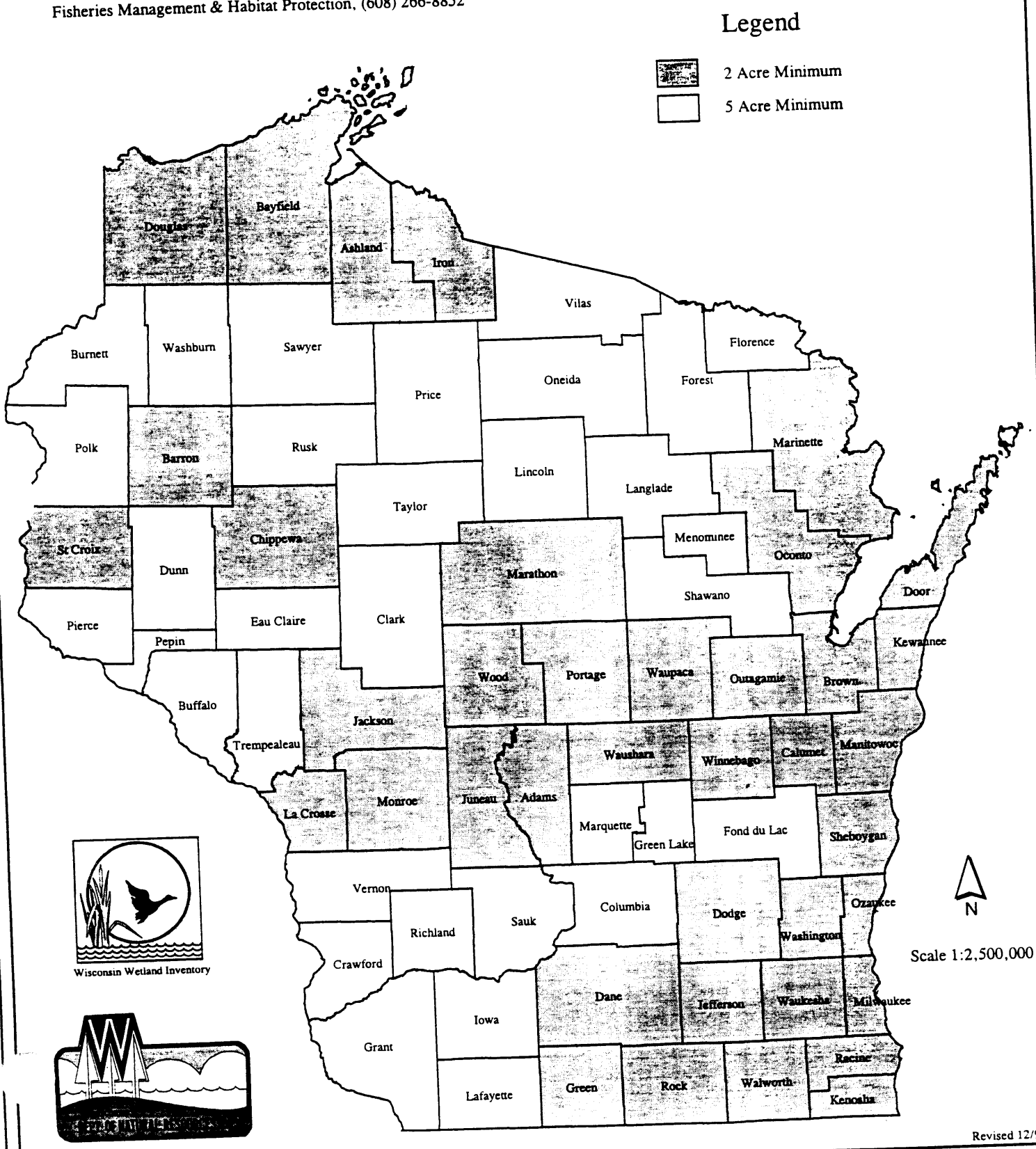
GEORGE E. MEYER
Secretary
WI Department of Natural Resources



After Thwaites, 1956

THE WISCONSIN WETLAND INVENTORY MINIMUM MAP UNITS

For further information contact:
Wisconsin Department of Natural Resources
Fisheries Management & Habitat Protection, (608) 266-8852



Revised 12/96

WETLAND DOCUMENTATION RECORD
Remotely Sensed Data Summary

Appellant:_____ County_____ State_____

Slide Reviewer_____ Date_____

Site Identification No. _____ - _____ (Tract No. + Site No.)

Farm Service Agency Aerial Color Slide Data

Date (Mo./Yr)	April-June Rainfall (in) + D/N/W (ave.= _____)	Interpretation- (codes listed in box below)

Air Photos

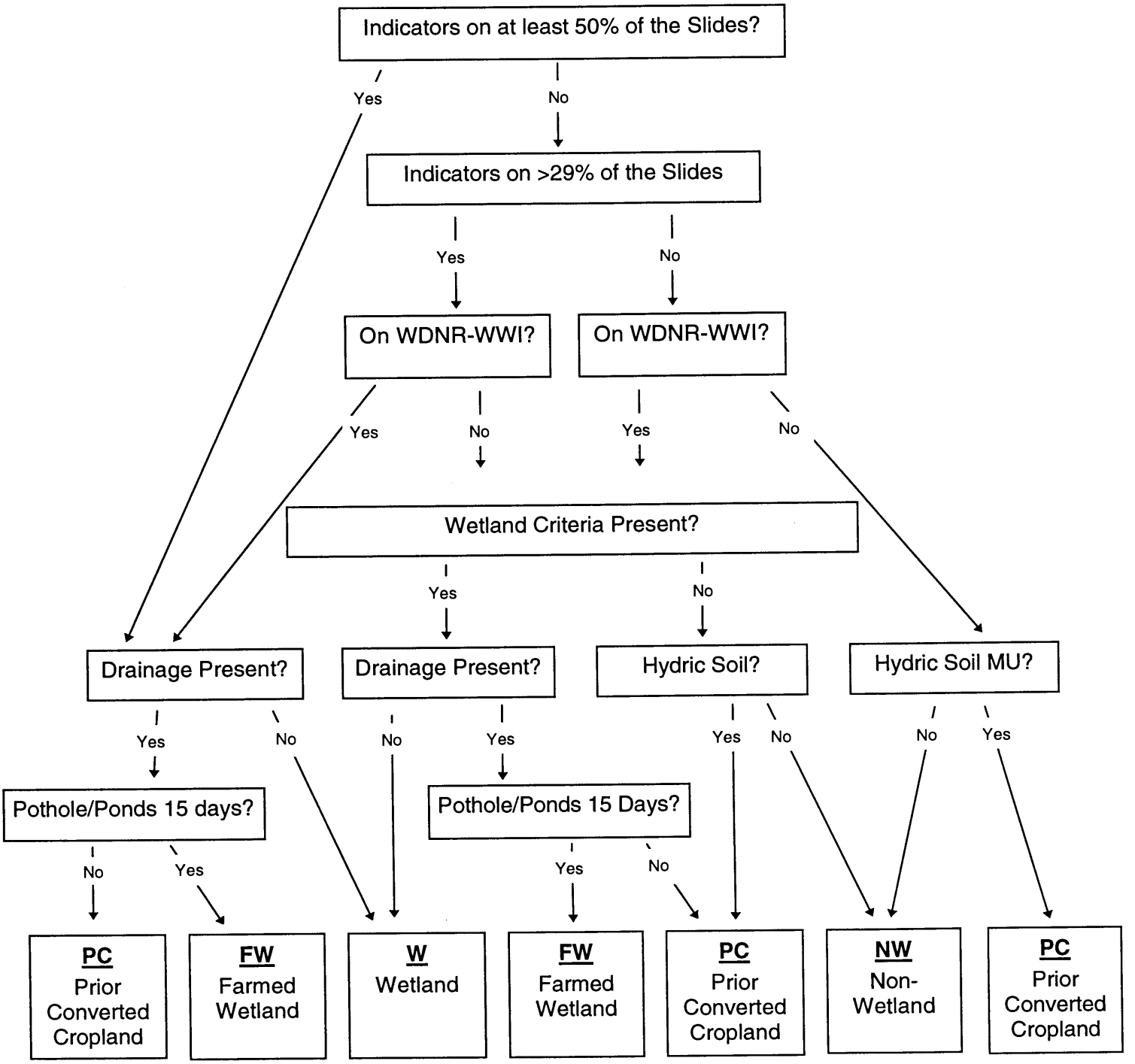
Y = signal indicates wetness (+ = strong, - = weak)
CR = cropped (row crop or tilled)
N = NO wetness signature
NC = not cropped (hay, pasture, idle, etc.)

Feature	Color	Manipulation	Other
1 = water	6a = dark green	7a = ditched	write explanation
2 = mud flat	6b = light green	7b = tiled	
3 = bare spot	6c = yellow	7c = filled	
4 = drowned crop	6d = brown	7d = tree/brush removal	
5 = planted late	6e = black	8 = plowed/tilled	

Does Slide/Air Photo data indicate the site has wetland hydrology? (y/n) _____

#____years out of #____years observed have wet (Y) signatures.

FSA Wetland Determination on Cropland by Aerial Slide Review*



*On-site verification is required for final determination/delineation.

APPENDIX F
HYDROLOGIC MONITORING REFERENCES

Hydrologic Monitoring References

1. Updated Monitoring Well Specifications for Organic Soils with Ditch Systems (Eggers, 2007)
2. Guidance on Design, Installation and Interpretation of Monitoring Wells for Wetland Hydrology Determinations (PN March 28, 2006)
3. Technical Standard for Water-Table Monitoring of Potential Wetland Sites (ERDC TN-WRAP-05-2 June 2005)
4. Hydrology Tools for Wetland Determination (NRCS Engineering Field Handbook Chapter 19, 1997)
5. Water Table Monitoring Project Design (ERDC TN-WRAP-06-2 January 2006)
6. Installing Monitoring Wells in Soils (NRCS National Soil Survey Center Version 1.0 August 2008)
7. Accessing and Using Meteorological Data to Evaluate Wetland Hydrology (ERDC/EL TR-WRAP-00-1 April 2000)
8. Methods to Determine the Hydrology of Potential Wetland Sites (WRP Technical Note HY-DE-4.1 January 1998)
9. Guidelines for Conducting and Reporting Hydrologic Assessments of Potential Wetland Sites (ERDC TN-WRAP-00-01 June 2000)
10. A National Survey of Potential Wetland Hydrology Regional Indicators (ERDC TN-WRAP-05-1 January 2005)